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CANADA BRICK QUARRY SURFACE WATER SURVEY SIXTH ANNUAL REPORT 1987

Report No 87-283-K

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ABSTRACT

The surface water monitoring program was carried out at Mary Fix Creek on October 8, 1986, and April 3 and June 25, 1987. To date there is no indication that fly ash leachate has been discharged from the underdrain sump to the Creek. Levels of suspended solids, sodium, boron and strontium generally rose in October, 1986, which suggests that possible contamination of Mary Fix Creek by fly ash leachate might have occurred. However, the levels measured in October, 1986, were well below values reported in August, 1982, September, 1983 and July, 1985. Trace heavy metals generally conformed to the Provincial Surface Water Quality Objectives.

job	file	date	report no.
31-126-892	837.71	December 14, 1987	87-283-K

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EXECUTIVE SUMMARY

CANADA BRICK QUARRY SURFACE WATER SURVEY SIXTH ANNUAL REPORT 1987

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Since December, 1981, fly ash from Lakeview TGS has been disposed of as landfill at Canada Brick Quarry, Mississauga, in accordance with a Provisional Certificate of Approval issued by the Ontario Ministry of the Environment (MOE). One of the conditions set in the certificate required regular monitoring of local surface water and ground water in and around the Canada Brick Quarry property. Mary Fix Creek, which traverses the Canada Brick Quarry ash disposal site was sampled on October 8, 1986, and April 3 and June 25, 1987. To date no discharge of fly ash leachate from the local sump has occurred. There has been no change in major ion chemistry along the flow path studied. In general, trace heavy metal concentrations measured in the unfiltered samples conformed to Provincial Surface Water Quality Objectives. Total suspended solids, boron, sodium and strontium concentrations were high in the October, 1986 samples, which suggests that possible contamination of Mary Fix Creek by fly ash leachate might have occurred at that time. However, the concentrations for boron, strontium and sodium measured in October, 1986, were below levels found in August, 1982, September, 1983 and July, 1985. The increased suspended solids concentration, particularly at the CPO, may be attributed to run-off coupled with land development occurring north of the area.

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To: MR. D. ERWIN
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CANADA BRICK QUARRY SURFACE WATER SURVEY SIXTH ANNUAL REPORT 1987

1. INTRODUCTION

In accordance with the MOE's Provisional Certificate No A220113, a monitoring program for Mary Fix Creek surface water quality has been underway at the Canada Brick Quarry Reclamation Project, Mississauga (Figure 1) since December 18, 1981. Five annual reports/1,2,3,4,5/ have been issued to date and no significant change in major ion chemistry has been observed.

This report covers the surface water sampling program from October, 1986 to June, 1987. The analytical data reported includes all the previous surface water surveys, as well as surveys carried out in the 1987 sampling year.

2. FLOW MEASUREMENTS

Flow rate measurements for Mary Fix Creek have always been carried out using a "portable" chain gauge in the culvert located at the CP railway overpass (CPO). For the 1987 sampling period, the water level in the culvert was not measured because the culvert was inaccessible. The inaccessibility of the culvert is attributed to erosion of the stream bed of Mary Fix Creek, as well as the embankment directly below the culvert. Measuring the water level in the culvert would entail reaching up to a height of approximately five metres which is impractical. An alternate location downstream of the CPO is being considered for flow measurement in the 1988 sampling period.

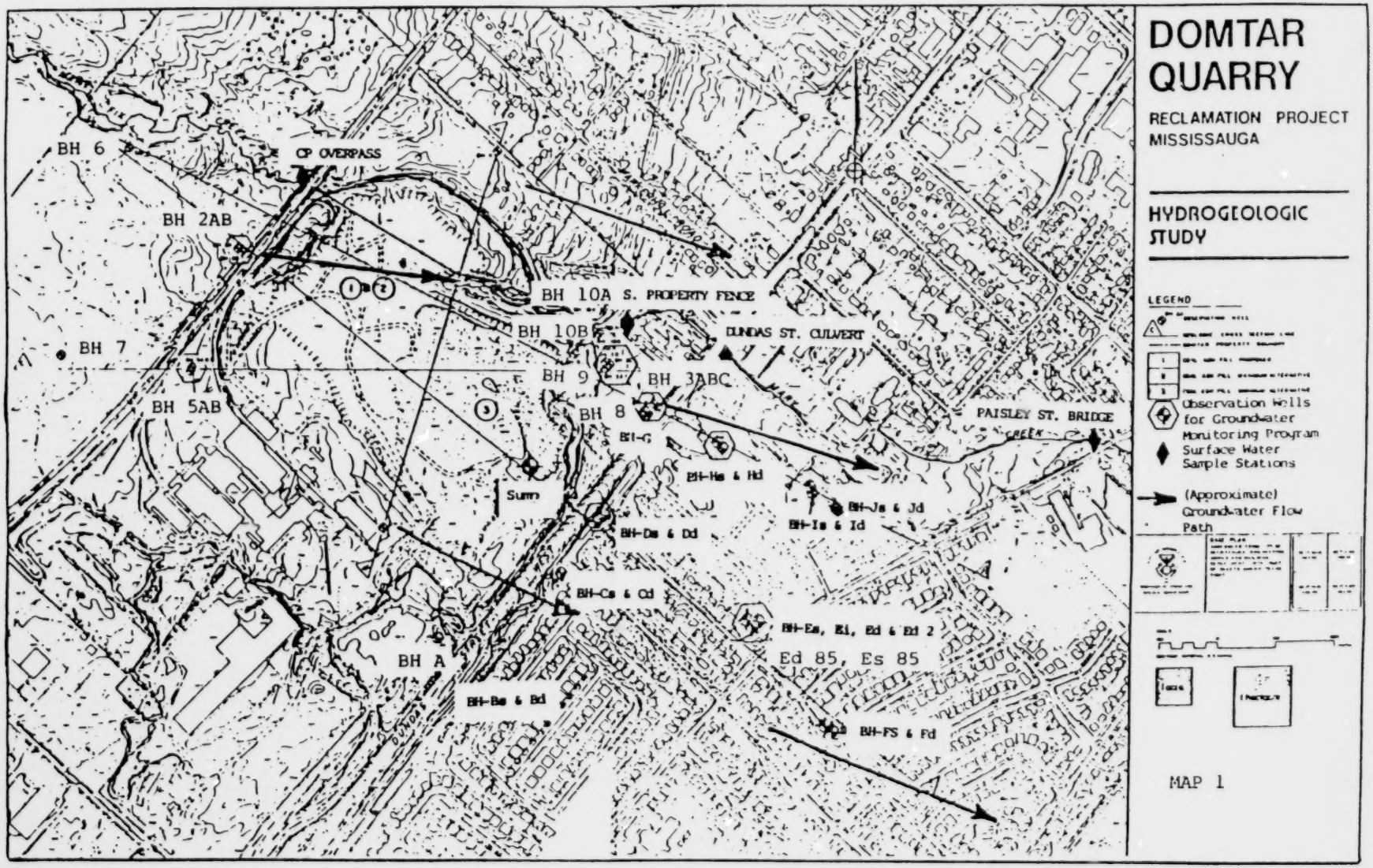
DOMTAR
QUARRY
RECLAMATION PROJECT
MISSISSAUGA
HYDROGEOLOGIC
STUDY
LEGEND
Observation Wells for Groundwater Monitoring Program
Surface Water Sample Stations
(Approximate) Groundwater Flow Path
MAP 1
BH 6
CP OVERPASS
BH 2AB
BH 10A
S. PROPERTY FENCE
BH 10B
DUNDAS ST. CULVERT
BH 7
BH 9
BH 3ABC
BH 5AB
BH 8
PAISLEY ST. BRIDGE
Sump
BH A
Ed 85, Es 85

Figure 1

3. SURFACE WATER QUALITY MONITORING

Sampling was carried out on October 8, 1986, April 3 and June 25, 1987. Water samples were collected at each of the locations listed below:

(1) CP Overpass (CPO)

(2) South Property Fence (SPF)

(3) Dundas Street Culvert (DSC)

(4) Paisley Street Bridge (PSB)

To meet the MOE requirement for determination of **total** trace heavy metals in surface waters /6/, duplicate samples were taken at each location. The procedure used for sample collection and preservation is described in detail in Appendix A.

One sample from each set was filtered through a 0.45 µm Millipore filter prior to submission for chemical analysis. The other unfiltered sample was submitted for the determination of total trace heavy metals (except mercury) /6,7/.

Analytical data for the 1986-1987 sampling period are summarized in Tables B1 to B4 of Appendix B. Included in the summary are previous data for comparison. Major ion chemistry and Piper trilinear diagrams for each of the four sampling locations are summarized in Tables C1 to C4 and Figures 2 to 5 of Appendix C.

The characteristics of Mary Fix Creek water passing through the Canada Brick Quarry during the 1986-1987 sampling period indicate that the water quality is within the region of "no dominance" of cations or anions and that there was no significant change in major ion chemistry of the water within the Quarry.

Levels of suspended solids (TSS) were high, particularly at location CPO, where the (TSS) concentration was 3800 mg/L during the October 8, 1986 sampling. The elevated TSS concentration may be attributed to runoff coupled with land development occurring (for houses and condominiums) north of the CPO. The TSS concentrations at SPF, DSC and PSB were 445 mg/L, 626 mg/L and 260 mg/L respectively. In general, most of the major element concentrations increased at each location in the October, 1986 sample, but decreased to background (CPO) levels by June, 1987. The most significant increases occurred at the SPF and DSC for elements such as sodium, boron and strontium, which suggests that possible contamination of Mary Fix Creek by fly ash leachate might have occurred. However, these increases were well below values found in August, 1982, September, 1983 and June, 1985. In comparing trace element concentrations found in June, 1987 to the Provincial Surface Water Quality Objectives, the elements that exceeded the objectives were as follows:

IRON (Objective (unfiltered sample) 0.3 mg/L) present at 0.91 mg/L at the CP Overpass, dropping to 0.55 mg/L at South Property Fence, 0.4 mg/L at Dundas Street Culvert and 0.27 mg/L at Paisley Street Bridge.

MERCURY (Objective (filtered sample) 0.0002 mg/L) present at the CP Overpass at 0.0007 mg/L and dropping to <0.0002 mg/l downstream at all three locations.

The increases in trace metal concentrations are not fly ash related as it is evident that trace metal levels were high at the CPO and actually decreased on passing through the Canada Brick Quarry site. Nitrate concentrations remained low during the 1986-1987 sampling period as compared to levels experienced in 1985 /4/.

4. DISCUSSION

Changes are happening in and around the Canada Brick Quarry site that may affect the sampling locations as well as the water quality of Mary Fix Creek. One of the changes involves major land developments (for houses and condominiums) north of the CPO. Storm sewers are being installed that will discharge into Mary Fix Creek. The developments may have an impact on Mary Fix Creek with respect to the additional flows expected from the storm sewers and the quality of the water. Since the objective of the surface water monitoring program is to detect potential leachate seepage or discharge, the flow rate and the water quality of Mary Fix Creek before and after Canada Brick Quarry Complex are important. Interferences from storm sewer discharges should be avoided where possible. The incoming water at the CPO, SPF and DSC should still be monitored, however, the Paisley Street Bridge (PSB) location already has other inflows (storm sewer) to the Creek. The levels of constituents measured at PSB are no longer meaningful as they do not reflect changes in the water quality (exclusively) due to fly ash leachate. It is proposed that surface water monitoring at the PSB be discontinued for the reasons stated above. The ash disposal site is full and is in the process of being capped with clay by the end of the year.

5. SUMMARY AND CONCLUSIONS

Mary Fix Creek was sampled in October, 1986, and April and June, 1987. The waters at all four sampling locations were characterized by "no dominance" of cations and anions. Other element concentrations, particularly boron, strontium and sodium, increased considerably in October, 1986 compared to the pre-operational maxima (1980-81). The increases for boron and strontium suggest that possible contamination of Mary Fix Creek by fly ash leachate might have occurred in October, 1986. Previous data collected for the surface water indicate that the boron and strontium levels found in October, 1986 were below values reported in 1982, 1983 and 1985. In addition, there is no indication to date (June, 1987), that fly ash leachate has been discharged from the underdrain sump to the Creek.

6. FUTURE WORK

In light of the fact that the landfill site is full and is in the process of being capped with clay, a reduced surface water monitoring program may be appropriate. Water quality monitoring at the CPO, SPF and DSC could be done twice annually. Flow measurements at the CPO and SPF should be carried out to enable mass load calculations. When a lagoon is constructed for run-off collection, the effluent from the lagoon could be discharged to the Creek under appropriate conditions, such as during high flow periods. Prior to discharge of the lagoon effluent, chemical analysis may be required for parameters such as total suspended solids, total dissolved solids, boron, strontium, chlorides and sodium.

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REFERENCES

(1) Ontario Hydro Research Division Report No 82-480-K.

(2) Ontario Hydro Research Division Report No 83-523-K.

(3) Ontario Hydro Research Division Report No 84-453-K.

(4) Ontario Hydro Research Division Report No 85-326-K.

(5) Ontario Hydro Research Division Report No 82-332-K.

(6) "Water Management. Goals, Policies, Objectives and Implementation Procedures of the Ministry of the Environment." Published November, 1978.

(7) "Standard Methods for the Examination of Water and Wastewater," 15th Edition, Part 302, American Public Health Association, New York, N.Y., 1980.

APPENDIX A

CANADA BRICK QUARRY SURFACE WATER SURVEY
(MARY FIX CREEK)

METHOD OF
SAMPLE COLLECTION AND
PREPARATION FOR ANALYSIS

Pairs of samples from each location were collected in specially acid-pretreated linear polyethylene (LPE) 1-L bottles, stored in a cooler (~4°C) and returned the same day to the laboratory. Details of sample handling and preservation, prior to submission for detailed chemical analysis, are described below.

(a) Filtered Samples

One sample of each pair was filtered in the laboratory through a 0.45 μm Millipore filter to remove suspended solids. The glass Millipore vacuum filtration apparatus was cleaned by soaking in 1:1 hydrochloric acid (HC1) followed by a deionized water rinse and a further soaking in 1:1 nitric acid (HNO_3). This was followed by several thorough rinsings with deionized water. Millipore filters were rinsed by passing 500 mL of deionized water through the filter and discarding the filtrate. A small volume (~20 mL) of the sample was passed through the filter and also discarded, then the bulk of the sample was filtered. The empty original sample container was rinsed several times with deionized water, given a final rinse using a small volume (~10 mL) of sample filtrate, and reused for storing the unacidified portion.

The portion of the filtrate for trace metal analysis was acidified with ultrapure HNO_3 to a background concentration of 0.1 M. The unacidified portion for pH, alkalinity, conductivity and anion analysis was stored at ~4°C.

(b) Unfiltered Samples

To determine **total** concentrations of dissolved components (in particular, trace metals), samples were submitted for chemical analysis **without** filtration in accordance with MOE Objectives/6/. A portion of each sample was acidified with ultrapure HNO_3 to a background of 0.1 M, and an unacidified portion stored at ~4°C pending pH, alkalinity, conductivity and anion analysis.

APPENDIX B

CANADA BRICK QUARRY SURFACE WATER SURVEY
(MARY FIX CREEK)

CHEMICAL ANALYSIS
1980-1987

Sampling Locations

CPO = CP Overpass
SPF = South Property Fence
DSC = Dundas Street Culvert
PSB = Paisley Street Bridge

All values are in mg/L except pH and conductivity

- pH in pH units
- conductivity in mS/m
- Alkalinity in mg/L As $CaCO_3$

Table B1

Chemical Characteristics of Canada Brick Quarry Surface Water

Location CPO

Date	800507	811130	820314	820324	820813	820827	820924	830921	830922*
AG	--	<0.0002	--	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
AL	--	<0.200	--	<0.200	<0.600	<0.200	<0.500	<0.500	<0.500
ALKCO3	2.00	--	<5.00	<5.00	24.0	<5.00	10.0	26.0	24.0
ALKHCO3	201	110	36.0	86.0	240	64.0	137	163	165
ALKOH	<5.00	--	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00
AS	--	0.0010	--	<0.0010	0.0010	<0.0020	<0.0020	<0.0010	<0.0010
B	--	<0.500	--	<1.00	<0.500	<0.500	<1.00	0.160	0.190
BA	--	<1.00	--	<2.00	<8.00	1.00	1.30	<2.00	<0.500
BE	--	--	--	--	<0.0002	<0.0002	<0.0002	--	--
BR	--	0.100	--	<0.200	0.600	<0.200	1.40	0.210	0.590
CA	81.0	57.0	15.0	34.0	116	43.0	72.0	89.0	88.0
CD	--	0.0009	--	0.0003	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
CL	136	40.0	26.0	60.0	177	22.0	85.0	120	130
CO	--	--	--	--	--	--	<0.0500	--	--
COND	94.0	47.0	19.0	39.0	124	35.0	66.0	94.0	94.0
CR	--	<0.100	--	<0.0500	<0.0500	0.0030	<0.0500	<0.100	<0.100
CR(VI)	--	0.0090	--	0.0080	0.0040	--	--	<0.0100	<0.0100
CU	--	0.0030	--	0.0050	0.0040	0.0080	0.0030	0.0040	0.0050
FE	--	<0.0500	--	0.0500	<0.0500	<0.0500	<0.0100	<0.0500	0.460
HARD	303	208	49.0	120	429	142	250	313	315
HG	--	--	--	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
I	--	<0.0100	--	<0.0200	<0.200	<0.0500	<0.0500	<0.0050	<0.0050
K	6.00	4.90	3.90	4.30	4.00	3.40	4.90	0.660	0.670
MG	24.4	16.0	2.70	8.30	34.0	8.40	18.0	22.0	23.0
MN	--	<0.0200	--	0.200	0.240	<0.0200	<0.0200	0.0500	0.0600
MO	--	<0.500	--	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500
NA	60.0	20.0	16.0	27.0	97.0	12.0	34.0	71.0	71.0
NI	--	<0.0050	--	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
NO3	<0.100	<0.100	--	0.100	<0.200	17.0	4.50	<1.00	0.440
PB	--	0.0020	--	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
PH	8.30	8.10	7.00	7.80	8.20	7.90	8.00	8.30	8.20
SE	--	0.0010	--	<0.0010	<0.0020	<0.0020	<0.0020	<0.0010	<0.0010
SIO2	--	5.00	--	3.30	4.80	3.60	7.40	7.47	7.10
SO4	81.0	70.0	14.0	26.0	140	49.0	95.0	95.0	94.0
SR	--	0.130	--	0.140	0.800	0.130	0.280	0.500	0.500
TDS105	--	370	--	260	756	208	380	628	614
TI	--	<0.500	--	<1.00	<2.00	<1.00	<1.00	<1.00	<1.00
TOC	--	--	--	15.0	22.0	12.0	17.0	6.00	4.00
TSS105	--	22.0	--	--	--	--	31.0	7.00	7.00
U	--	<0.0100	--	<0.0100	<0.0600	<0.0200	<0.0010	<0.0100	<0.0100
V	--	<0.0050	--	<0.0100	<0.0200	<0.0030	<0.500	<0.0050	<0.0050
ZN	--	<0.0200	--	<0.0200	<0.0200	<0.0200	<0.0200	<0.0200	<0.0200

* Unfiltered sample dated one day after actual sampling.

Table B1 (Cont)

Chemical Characteristics of Canada Brick Quarry Surface Water

Location CPO

Date	831017	831018*	840217	840218*	840930	841001*	850702	850703*
AG	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
AL	<0.500	6.00	<0.500	6.80	<0.500	1.60	<1.00	<1.00
ALKCO3	<5.00	<5.00	<5.00	<5.00	7.00	<5.00	<5.00	<5.00
ALKHCO3	64.0	68.0	37.0	45.0	95.0	103	218	219
ALKOH	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00
AS	0.0010	<0.0010	<0.0010	0.0010	<0.0010	<0.0010	<0.0010	<0.0010
B	0.110	0.110	0.0800	0.0500	<0.0500	<0.0500	0.150	0.180
BA	<1.00	<1.00	<1.00	<1.00	<2.00	<2.00	<5.00	<5.00
BE	--	--	--	--	--	--	--	--
BR	<0.0500	<0.0500	<0.100	<0.100	<0.200	0.200	0.900	<0.500
CA	29.0	31.0	21.4	26.9	34.7	46.1	130	129
CD	<0.0001	0.0002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0003	<0.0003
CL	24.0	24.0	61.5	66.1	99.0	98.0	639	572
CO	--	--	--	--	--	--	--	--
COND	28.3	28.6	34.0	34.0	62.0	61.0	241	240
CR	<0.100	<0.100	<0.0500	<0.0500	<0.100	<0.100	<0.100	<0.100
CR(VI)	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0050	<0.0050
CU	0.0030	0.0100	0.0090	0.0120	0.0020	0.0080	0.0070	0.0090
FE	0.130	5.60	0.100	9.60	<0.100	0.880	<0.0500	0.180
HARD	96.0	119	71.0	116	137	166	494	491
HG	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	0.0006	<0.0002	<0.0002
I	<0.0050	<0.0050	<0.0500	<0.0500	0.0600	<0.0600	<0.100	<0.100
K	4.90	6.30	3.10	7.30	4.87	5.49	6.75	6.48
MG	5.70	7.80	4.30	7.70	12.2	12.5	40.7	41.2
MN	<0.0500	0.260	0.0800	0.340	<0.0500	<0.0500	0.0980	0.0980
MO	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	0.500
NA	16.0	16.0	35.0	33.0	34.6	47.8	310	313
NI	<0.0050	0.0060	<0.0050	0.0100	<0.0050	<0.0050	<0.0100	<0.0100
NO3	0.0200	1.43	4.09	4.20	0.130	0.0900	--	<0.0090
PB	0.0020	0.0160	<0.0020	0.0080	<0.0020	<0.0020	<0.0050	<0.0050
PH	7.90	7.70	7.40	7.50	7.90	7.60	8.30	8.30
SE	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
SIO2	3.89	3.70	2.94	12.0	2.70	8.50	1.41	2.06
SO4	30.0	29.0	17.3	18.3	44.0	43.0	151	140
SR	0.120	0.150	0.100	0.130	0.340	0.340	1.22	1.22
TDS105	190	190	222	230	392	378	1460	1350
TI	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
TOC	8.00	10.0	12.4	12.3	25.0	25.0	30.0	27.5
TSS105	--	15.0	--	387	--	--	--	3.10
U	<0.0500	<0.0500	<0.0100	<0.0100	<0.0500	<0.0500	<0.100	<0.100
V	<0.0050	<0.0050	<0.0050	0.0300	<0.0100	<0.0100	<0.100	<0.0500
ZN	<0.0200	0.0400	<0.0200	0.0300	<0.0200	<0.0200	<0.0200	<0.0200

* Unfiltered sample dated one day after actual sampling.

Table B1 (Cont)

Chemical Characteristics of Canada Brick Quarry Surface Water

Location CPO

Date	851105	851106*	860618	860619*	861008	861009*	870403	870404*
AG	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0005	<0.0002	<0.0002
AL	<1.00	3.30	<1.00	22.7	<1.00	32.0	<1.00	2.00
ALKCO3	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00
ALKHCO3	107	90.0	188	188	162.	160.	137.	138.
ALKOH	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00
AS	<0.0010	<0.0010	0.0010	0.0050	<0.0010	0.0020	0.0012	0.0021
B	0.100	0.160	0.130	0.170	0.210	0.220	0.150	0.200
BA	<0.500	<0.500	<0.500	<0.500	<8.00	<60.0	<15.0	<15.0
BE	--	--	--	--	--	--	--	--
BR	<0.100	<0.100	0.300	<0.500	0.700	2.00	<5.00	<10.0
CA	39.1	40.9	74.0	88.0	69.0	138.	69.0	72.0
CD	<0.0001	<0.0001	<0.0002	<0.0002	<0.0002	0.0002	<0.0001	<0.0001
CL	43.6	42.2	193	192	118.	120.	220.	240.
CO	--	--	--	--	--	--	--	--
COND	40.5	40.0	114	114	78.0	77.5	114.	116.
CR	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100
CR(VI)	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0050	<0.0050
CU	0.0040	0.0030	0.0060	0.0450	0.0120	0.130	0.0040	0.0100
FE	0.100	1.95	<0.0500	38.0	<0.0500	40.0	<0.100	3.20
HARD	134	143	273	421	252.	500.	254.	270.
HG	<0.0002	0.0003	<0.0002	<0.0002	<0.0002	0.0007	0.0002	<0.0002
I	<0.0500	<0.0600	<0.100	<0.300	<0.200	<2.00	<0.500	<0.500
K	4.61	4.95	5.00	7.50	6.70	10.0	5.00	5.10
MG	8.93	9.96	21.7	32.5	19.5	38.0	20.0	21.0
MN	<0.0500	0.0500	0.0500	0.700	<0.0500	1.06	0.0600	0.130
MO	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500
NA	28.9	29.3	105	104	67.0	69.0	119.	122.
NI	<0.0050	<0.0050	<0.0050	0.0440	<0.0050	0.158	<0.0050	0.0050
NO3	0.337	1.86	1.23	1.70	1.80	1.75	3.80	3.91
PB	<0.0020	<0.0020	<0.0050	<0.0050	<0.0050	0.0080	<0.0020	<0.0020
PH	7.80	7.30	8.10	7.90	8.30	8.40	8.27	8.06
SE	0.0010	0.0030	0.0010	0.0030	0.0070	0.0200	0.0010	0.0020
SIO2	0.620	3.13	6.25	--	6.70	75.0	5.05	13.5
SO4	38.5	37.7	67.0	70.0	78.0	112.	99.0	99.0
SR	0.400	0.320	0.700	0.780	0.770	1.00	0.730	0.710
TDS105	252	239	550	650	472.	466.	763.	731.
TI	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
TOC	12.0	9.00	30.0	45.0	8.00	6.00	8.20	8.30
TSS105	--	14.0	--	--	--	3800	--	--
U	<0.0500	<0.0200	0.0200	<0.100	<0.0600	<2.00	<0.200	<0.200
V	<1.00	<1.00	<0.0100	0.180	<0.0100	1.50	<0.0500	<0.0500
ZN	<0.0200	0.0200	<0.0200	0.100	<0.0200	0.140	<0.0200	<0.0200

* Unfiltered sample dated one day after actual sampling.

Table B1 (Cont)

Chemical Characteristics of Canada Brick Quarry Surface Water

Location CPO

Date	870625	870626*
AG	<0.0005	<0.0005
AL	<1.00	<1.00
ALKCO3	<5.00	<5.00
ALKHCO3	200.	197.
ALKOH	<5.00	<5.00
AS	<0.0010	<0.0010
B	0.350	0.350
BA	<2.00	<2.00
BE	--	--
BR	<0.500	0.500
CA	100.	100.
CD	<0.0001	<0.0001
CL	233.	231.
CO	--	--
COND	146.	145.
CR	<0.100	<0.100
CR(VI)	--	<0.0050
CU	0.0040	0.0060
FE	<0.0500	0.910
HARD	394.	398.
HG	0.0007	<0.0002
I	<0.0500	<0.0500
K	14.0	14.0
MG	35.0	36.0
MN	<0.0500	0.0600
MO	<0.500	<0.500
NA	141.	140.
NI	<0.0050	<0.0050
NO3	6.50	6.60
PB	<0.0050	<0.0050
PH	8.30	8.20
SE	<0.0010	<0.0010
SIO2	6.80	6.35
SO4	149.	141.
SR	1.65	1.66
TDS105	928.	904.
TI	<1.00	<1.00
TOC	7.70	7.70
TSS105	--	--
U	<0.0200	<0.0200
V	<0.0100	<0.0100
ZN	<0.0200	<0.200

* Unfiltered sample dated one day after actual sampling.

Table B2

Chemical Characteristics of Canada Brick Quarry Surface Water

Location SPF

Date	800507	811130	820314	820324	820813	820827	820924	830921	830922*
AG	--	0.0002	--	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
AL	--	<0.200	--	<0.200	<3.00	<0.200	<0.500	<0.500	<0.500
ALKCO3	5.60	--	<5.00	<5.00	14.0	<5.00	13.0	14.0	25.0
ALKHCO3	190	110	40.0	83.0	99.0	63.0	120	117	107
ALKOH	<5.00	--	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00
AS	--	0.0010	--	<0.0010	<0.0010	<0.0020	<0.0020	0.0010	0.0010
B	--	<0.500	--	<1.00	2.50	<0.500	<1.00	2.10	2.11
BA	--	<1.00	--	<2.00	<40.0	1.00	1.40	<2.00	<2.00
BE	--	--	--	--	<0.0002	<0.0002	<0.0002	--	--
BR	--	0.100	--	<0.200	16.0	0.300	1.50	12.0	12.0
CA	79.0	57.0	17.0	33.0	259	45.0	72.0	207	208
CD	--	0.0002	--	<0.0010	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
CL	122	42.0	34.0	55.0	1700	41.0	215	1200	1130
CO	--	--	--	--	--	--	<0.0500	--	--
COND	90.0	50.0	23.3	36.5	600	43.0	107	445	445
CR	--	<0.100	--	<0.0500	<0.0500	0.0040	<0.0500	<0.100	<0.100
CR(VI)	--	0.0050	--	<0.0050	0.0040	--	--	<0.0100	<0.0100
CU	--	0.0030	--	0.0050	0.0070	0.0070	0.0030	0.0030	0.0040
FE	--	0.0500	--	0.0500	<0.0500	<0.0500	<0.100	<0.0500	0.410
HARD	291	215	56.0	116	869	148	250	707	712
HG	--	--	--	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
I	--	<0.0100	--	<0.0200	<1.00	<0.0500	<0.0500	<0.0200	<0.0200
K	5.00	5.40	4.00	4.60	42.0	4.10	9.80	35.0	35.0
MG	22.8	16.0	3.30	8.10	54.0	8.60	18.0	46.0	47.0
MN	--	<0.0200	--	0.200	0.0400	<0.0200	<0.0200	0.0500	0.0600
MO	--	0.500	--	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500
NA	61.0	26.0	19.0	28.0	900	2.90	105	630	640
NI	--	<0.0050	--	<0.0050	0.0120	<0.0050	<0.0050	<0.0050	<0.0050
NO3	<0.100	<0.100	--	0.100	15.0	21.0	8.00	13.0	10.1
PB	--	<0.0020	--	0.0200	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
PH	8.50	8.20	7.40	7.90	8.20	7.90	8.10	8.20	8.10
SE	--	<0.0010	--	<0.0010	<0.0020	<0.0020	<0.0020	0.0030	0.0030
SIO2	--	6.50	--	3.80	2.60	4.00	6.80	4.67	3.98
SO4	78.0	72.0	14.0	23.0	450	63.0	145	330	330
SR	--	0.130	--	0.140	4.80	0.200	0.640	2.85	2.85
TDS105	--	370	--	252	3770	260	620	2810	2680
TI	--	<0.500	--	<1.00	<10.0	<1.00	<1.00	<1.00	<1.00
TOC	--	--	--	15.0	9.00	10.0	17.0	12.0	14.0
TSS105	--	41.0	--	--	--	--	85.0	15.0	15.0
U	--	<0.0100	--	<0.0100	<0.300	<0.0200	<0.0010	<0.0500	<0.0500
V	--	<0.0050	--	<0.0100	<0.100	<0.0030	<0.500	<0.0200	<0.0200
ZN	--	<0.0200	--	<0.0200	<0.0200	<0.0200	<0.0200	<0.0200	<0.0200

* Unfiltered sample dated one day after actual sampling.

Table B2 (Cont)

Chemical Characteristics of Canada Brick Quarry Surface Water

Location SPF

Date	831017	831018*	840217	840218*	840930	841001*	850702	850703*
AG	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
AL	<0.500	23.0	<0.500	9.00	<0.500	1.90	<1.00	<1.00
ALKCO3	<5.00	<5.00	<5.00	<5.00	9.00	<5.00	<5.00	<5.00
ALKHCO3	67.0	94.0	39.0	50.0	94.0	103	137	138
ALKOH	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00
AS	0.0050	<0.0010	<0.0010	0.0020	<0.0010	<0.0010	<0.0010	<0.0010
B	0.200	0.200	0.0700	0.0700	0.150	0.200	3.04	3.05
BA	<1.00	<1.00	<1.00	<1.00	<2.00	3.00	<5.00	<5.00
BE	--	--	--	--	--	--	--	--
BR	0.150	0.250	<0.100	0.200	0.500	0.500	12.0	12.0
CA	29.0	40.0	22.0	35.0	35.7	49.9	261	264
CD	0.0001	0.0003	<0.0001	<0.0001	<0.0001	<0.0001	<0.0003	<0.0003
CL	35.0	35.0	65.4	66.6	125	118	1420	1310
CO	--	--	--	--	--	--	--	--
COND	34.0	34.1	36.0	37.0	70.0	70.0	505	505
CR	<0.100	<0.100	<0.0500	<0.0500	<0.100	<0.100	<0.100	<0.100
CR(VI)	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0050	<0.0050
CU	0.0030	0.0300	0.0030	0.0170	0.0080	0.0070	0.0060	0.0040
FE	0.130	38.0	0.0900	16.0	<0.100	1.48	<0.0500	0.351
HARD	97.0	250	73.0	159	120	164	881	900
HG	<0.0002	<0.0002	<0.0002	<0.0002	0.0006	0.0007	0.0003	0.0002
I	<0.0050	<0.0050	<0.0500	<0.0500	<0.0600	<0.0600	<0.100	<0.200
K	6.20	9.20	3.40	8.30	3.98	5.45	40.4	42.5
MG	6.10	20.0	4.50	10.5	7.50	9.60	55.9	58.6
MN	<0.0500	0.750	0.0800	0.460	<0.0500	<0.0500	0.0500	0.0500
MO	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	1.27	1.27
NA	27.0	27.0	43.0	36.0	49.4	70.8	720	725
NI	<0.0050	0.0240	<0.0050	0.0100	<0.0050	<0.0050	<0.0100	<0.0100
NO3	1.36	2.21	3.94	4.91	0.180	0.130	--	83.7
PB	0.0020	0.0210	<0.0020	0.0100	<0.0020	<0.0020	<0.0050	<0.0050
PH	7.50	7.80	7.30	7.60	7.90	7.70	8.20	8.20
SE	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0040	0.0020
SIO2	3.66	3.64	3.11	103	2.70	9.80	3.45	10.2
SO4	38.0	36.0	18.5	19.6	50.0	45.6	768	718
SR	0.190	0.280	0.120	0.160	0.490	0.520	5.95	5.95
TDS105	220	240	230	244	423	430	3440	3250
TI	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
TOC	13.0	12.0	11.8	13.5	19.0	21.0	25.0	26.5
TSS105	--	31.0	--	590	--	--	--	35.2
U	<0.0500	<0.0500	<0.0100	<0.0100	<0.0500	<0.0500	<0.100	<0.100
V	<0.0050	0.0170	<0.0050	0.0800	<0.0100	<0.0100	<0.100	<0.0500
ZN	<0.0200	0.120	<0.0200	0.0400	<0.0200	<0.0200	<0.0200	<0.0200

* Unfiltered sample dated one day after actual sampling.

Table B2 (Cont)

Chemical Characteristics of Canada Brick Quarry Surface Water

Location SPF

Date	851105	851106*	860618	860619*	861008	861009*	870403	870404*
AG	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0005	<0.0002	<0.0002
AL	<1.00	3.30	<1.00	5.00	<1.00	6.00	<1.00	3.30
ALKCO3	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00
ALKHCO3	88.0	90.0	187	189	131.	131.	135.	138.
ALKOH	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00
AS	0.0020	0.0030	<0.0010	<0.0010	<0.0010	0.0030	0.0012	0.0017
B	0.230	0.270	0.270	0.310	1.14	1.15	0.210	0.240
BA	<0.500	<0.500	<0.500	<0.500	<8.00	<8.00	<15.0	<15.0
BE	--	--	--	--	--	--	--	--
BR	<0.100	0.200	0.400	0.500	1.70	1.20	<5.00	<10.0
CA	41.4	42.5	72.7	75.0	86.0	86.0	68.0	71.0
CD	<0.0001	<0.0001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0001	0.0001
CL	51.1	51.5	215	210	162.	164.	222.	244.
CO	--	--	--	--	--	--	--	--
COND	46.5	47.5	120	122	110.	113.	115.	118.
CR	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100
CR(VI)	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0050	<0.0050
CU	0.0030	0.0030	0.0070	0.0150	0.0050	0.0300	0.0040	0.0100
FE	0.0500	2.29	<0.0500	4.20	<0.0500	9.50	<0.100	6.00
HARD	141	148	268	289	290.	300.	252.	267.
HG	<0.0002	0.0005	<0.0002	<0.0002	<0.0002	0.0003	<0.0002	<0.0002
I	<0.0500	<0.0500	<0.100	<0.300	<0.200	<0.200	<0.500	<0.500
K	5.95	6.21	5.87	7.80	16.0	17.0	5.80	6.10
MG	9.19	10.2	21.2	23.2	18.5	21.0	20.0	22.0
MN	<0.0500	0.0500	<0.0500	0.0900	<0.0500	0.160	0.0500	0.180
MO	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500
NA	40.8	38.3	130	130	113.	114.	128.	129.
NI	<0.0050	<0.0050	<0.0050	0.0050	<0.0050	0.0240	<0.0050	0.0050
NO3	0.0350	3.89	3.08	2.77	3.61	3.84	4.60	4.90
PB	<0.0020	<0.0020	<0.0050	<0.0050	<0.0050	<0.0050	<0.0020	<0.0020
PH	7.50	7.30	8.30	8.30	8.30	8.20	8.29	8.11
SE	0.0040	0.0030	0.0010	<0.0010	0.0080	0.0050	0.0017	0.0021
SIO2	0.210	25.3	5.15	5.05	4.00	4.60	4.40	21.0
SO4	58.4	55.5	85.0	88.0	229.	228.	102.	104.
SR	0.310	0.350	0.770	0.780	1.47	1.52	0.730	0.730
TDS105	243	276	600	700	684.	670.	735.	752.
TI	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
TOC	9.00	10.0	23.0	25.0	6.00	6.00	7.50	8.20
TSS105	--	165	--	--	--	445.	--	--
U	<0.0500	<0.0200	0.0200	<0.0500	<0.0600	<0.0600	<0.200	<0.200
V	<1.00	<1.00	<0.0100	0.0200	<0.0100	0.0600	<0.0500	<0.0500
ZN	<0.0200	0.0400	<0.0200	<0.0200	<0.0200	0.0300	<0.0200	0.0300

* Unfiltered sample dated one day after actual sampling.

Table B2 (Cont)

Chemical Characteristics of Canada Brick Quarry Surface Water

Location SPF

Date	870625	870626*
AG	<0.0005	<0.0005
AL	<1.00	<1.00
ALKCO3	<5.00	<5.00
ALKHCO3	174.	171.
ALKOH	<5.00	<5.00
AS	<0.0010	<0.0010
B	0.440	0.440
BA	<2.00	<2.00
BE	--	--
BR	0.500	<0.500
CA	90.0	91.0
CD	<0.0001	<0.0001
CL	245.	232.
CO	--	--
COND	142.	142.
CR	<0.100	<0.100
CR(VI)	--	<0.0050
CU	0.0040	0.0050
FE	<0.0500	0.550
HARD	351.	354.
HG	<0.0002	<0.0002
I	<0.0500	<0.0500
K	16.0	16.0
MG	31.0	31.0
MN	<0.0500	<0.500
MO	<0.500	<0.500
NA	152.	148.
NI	<0.0050	<0.0050
NO3	6.80	6.90
PB	<0.0050	<0.0050
PH	8.40	8.40
SE	<0.0010	<0.0010
SIO2	5.55	5.30
SO4	154.	147.
SR	1.59	1.66
TDS105	932.	924.
TI	<1.00	<1.00
TOC	7.10	6.70
TSS105	--	--
U	<0.0200	<0.0200
V	<0.0100	<0.0100
ZN	<0.0200	<0.200

* Unfiltered sample dated one day after actual sampling.

Table B3

Chemical Characteristics of Canada Brick Quarry Surface Water

Location DSC

Date	800507	811130	820314	820324	820813	820827	820924	830921	830922*
AG	--	--	--	--	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
AL	--	--	--	--	<3.00	<0.200	<0.500	<0.500	<0.500
ALKCO3	--	--	<5.00	--	17.0	<5.00	13.0	15.0	27.0
ALKHCO3	--	--	36.0	--	92.0	66.0	121	121	110
ALKOH	--	--	<5.00	--	<5.00	<5.00	<5.00	<5.00	<5.00
AS	--	--	--	--	<0.0010	<0.0020	<0.0020	0.0010	0.0010
B	--	--	--	--	2.50	<0.500	<1.00	2.05	2.06
BA	--	--	--	--	<40.0	1.00	1.30	<2.00	<2.00
BE	--	--	--	--	<0.0002	<0.0002	<0.0002	--	--
BR	--	--	--	--	14.0	0.300	0.200	12.0	10.0
CA	--	--	15.0	--	262	44.0	70.0	214	208
CD	--	--	--	--	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
CL	--	--	26.0	--	1580	38.0	165	1200	1030
CO	--	--	--	--	--	--	<0.0500	--	--
COND	--	--	20.0	--	560	42.0	105	450	450
CR	--	--	--	--	<0.0500	0.0060	<0.0500	<0.100	<0.100
CR(VI)	--	--	--	--	0.0050	--	--	<0.0100	<0.0100
CU	--	--	--	--	0.0070	0.0070	0.0050	0.0040	0.0040
FE	--	--	--	--	<0.0500	<0.0500	<0.100	<0.0500	0.360
HARD	--	--	49.0	--	881	146	250	742	717
HG	--	--	--	--	<0.0002	0.0002	<0.0002	<0.0002	<0.0002
I	--	--	--	--	<1.00	<0.0500	<0.0500	<0.0200	<0.0200
K	--	--	3.90	--	38.0	4.20	9.50	35.0	35.0
MG	--	--	2.70	--	55.0	8.80	18.0	48.0	48.0
MN	--	--	--	--	<0.0200	<0.0200	<0.0200	<0.0500	0.0400
MO	--	--	--	--	<0.500	<0.500	<0.500	<0.500	<0.500
NA	--	--	14.0	--	835	2.70	98.0	640	640
NI	--	--	--	--	0.0120	<0.0050	0.0050	<0.0050	<0.0050
NO3	--	--	--	--	13.0	21.0	8.00	11.0	9.73
PB	--	--	--	--	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
PH	--	--	7.20	--	8.10	7.90	8.20	8.20	8.20
SE	--	--	--	--	0.0220	<0.0020	<0.0020	0.0030	0.0030
SIO2	--	--	--	--	2.30	2.40	6.40	4.88	4.36
SO4	--	--	14.0	--	450	61.0	110	330	320
SR	--	--	--	--	5.50	0.200	0.590	2.85	2.85
TDS105	--	--	--	--	3410	262	590	2800	2860
TI	--	--	--	--	<10.0	<1.00	<1.00	<1.00	<1.00
TOC	--	--	--	--	10.0	9.00	16.0	7.00	7.00
TSS105	--	--	--	--	--	--	53.0	11.0	11.0
U	--	--	--	--	<0.300	<0.0200	<0.0010	<0.0500	<0.0500
V	--	--	--	--	<0.100	0.0030	<0.500	<0.0200	<0.0200
ZN	--	--	--	--	<0.0200	<0.0200	<0.0200	<0.0200	<0.0200

* Unfiltered sample dated one day after actual sampling.

Table B3 (Cont)

Chemical Characteristics of Canada Brick Quarry Surface Water

Location DSC

Date	831017	831018*	840217	840218*	840930	841001*	850702	850703*
AG	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	0.0013	0.0020
AL	<0.500	13.0	0.500	10.0	<0.500	2.80	<1.00	<1.00
ALKCO3	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00
ALKHCO3	75.0	91.0	40.0	52.0	104	108	137	138
ALKOH	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00
AS	0.0040	<0.0010	<0.0010	0.0020	<0.0010	<0.0010	<0.0010	<0.0010
B	0.180	0.190	0.0600	0.0600	0.160	0.230	3.19	3.19
BA	<1.00	<1.00	<1.00	<1.00	<2.00	<2.00	<7.00	<5.00
BE	--	--	--	--	--	--	--	--
BR	0.150	0.190	<0.100	<0.100	0.700	0.300	13.0	12.0
CA	33.0	38.0	22.1	35.0	51.1	41.5	267	263
CD	0.0001	0.0002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0003	<0.0003
CL	40.0	39.0	64.9	68.1	140	133	1340	1470
CO	--	--	--	--	--	--	--	--
COND	37.6	37.8	36.0	38.0	74.0	74.0	500	500
CR	<0.100	<0.100	<0.0500	<0.0500	<0.100	<0.100	<0.100	<0.100
CR(VI)	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0050	<0.0050
CU	0.0030	0.0140	0.0030	0.0190	0.0040	0.0080	0.0100	0.0040
FE	0.110	20.0	0.0600	17.5	<0.100	1.57	<0.0500	0.0950
HARD	111	184	74.0	164	180	159	892	891
HG	<0.0002	<0.0002	<0.0002	<0.0002	0.0010	0.0007	0.0002	0.0002
I	<0.0050	<0.0050	<0.0500	<0.0500	<0.0600	0.350	<0.200	<0.100
K	5.90	8.10	3.40	9.70	6.96	8.18	43.2	39.8
MG	7.20	13.0	4.60	11.1	12.9	13.7	54.9	57.0
MN	<0.0500	0.420	0.0700	0.490	<0.0500	<0.0500	<0.0500	<0.0500
MO	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	1.45	1.45
NA	28.0	28.0	39.0	37.0	78.9	61.9	712	719
NI	<0.0050	0.0120	<0.0050	0.0100	<0.0050	<0.0050	<0.0100	<0.0100
NO3	1.20	2.13	3.87	4.88	0.180	0.130	--	85.1
PB	0.0020	0.0160	<0.0020	0.0110	<0.0020	<0.0020	<0.0050	<0.0050
PH	8.10	7.80	7.40	7.60	7.80	7.70	8.30	8.30
SE	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0030	0.0030
SIO2	4.24	4.00	2.94	103	2.70	11.5	3.41	3.56
SO4	40.0	41.0	20.1	19.5	54.0	53.4	788	880
SR	0.220	0.280	0.120	0.170	0.500	0.970	6.01	6.01
TDS105	240	250	228	246	466	462	3310	3270
TI	<1.00	<1.00	<1.00	<1.00	<1.00	1.30	<1.00	<1.00
TOC	12.0	13.0	12.2	12.7	24.0	26.0	23.5	22.0
TSS105	--	24.0	--	630	--	--	--	24.1
U	<0.0500	<0.0500	<0.0100	<0.0100	<0.0500	<0.0500	<0.100	<0.100
V	<0.0050	0.0180	<0.0050	0.0700	<0.0100	<0.0100	<0.100	<0.0500
ZN	<0.0200	0.0700	<0.0200	0.0500	<0.0200	<0.0200	<0.0200	<0.0200

* Unfiltered sample dated one day after actual sampling.

Table 83 (Cont)

Chemical Characteristics of Canada Brick Quarry Surface Water

Location DSC

Date	851105	851106*	860618	860619*	861008	861009*	870403	870404*
AG	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0005	<0.0002	<0.0002
AL	<1.00	2.90	<1.00	2.70	<1.00	8.00	<1.00	5.40
ALKCO3	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00
ALKHCO3	91.0	92.0	186	188	130.	130.	135.	142.
ALKOH	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00
AS	0.0020	0.0030	<0.0010	<0.0010	<0.0010	0.0030	<0.0010	0.0017
B	0.230	0.290	0.270	0.290	1.15	1.16	0.200	0.230
BA	<0.500	<0.500	<0.500	<0.500	<8.00	<8.00	<15.0	<15.0
BE	--	--	--	--	--	--	--	--
BR	<0.100	0.400	0.500	0.600	1.30	1.10	<5.00	<10.0
CA	42.9	43.9	73.5	75.0	84.0	90.0	67.0	77.0
CD	<0.0001	<0.0001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0001	0.0002
CL	54.8	56.6	217	213	162.	160.	222.	233.
CO	--	--	--	--	--	--	--	--
COND	48.5	48.5	123	123	113.	115.	112.	112.
CR	<0.100	0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100
CR(VI)	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0050	<0.0050
CU	0.0030	0.0060	0.0140	0.0140	0.0080	0.0360	0.0040	0.0140
FE	0.0500	2.49	<0.0500	2.00	<0.0500	11.0	<0.100	11.0
HARD	146	152	270	280	286.	312.	249.	286.
HG	<0.0002	0.0004	<0.0002	<0.0002	<0.0002	0.0002	<0.0002	0.0002
I	<0.0500	<0.0700	<0.100	<0.300	<0.200	<0.200	<0.500	<0.500
K	5.98	6.25	6.10	7.20	16.0	17.0	5.70	6.30
MG	9.46	10.5	21.2	22.5	18.5	21.5	20.0	23.0
MN	<0.0500	0.0500	<0.0500	<0.0500	<0.0500	0.210	0.0500	0.220
MO	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500
NA	42.7	39.7	129	132	114.	114.	124.	123.
NI	<0.0050	0.0060	<0.0050	0.0050	<0.0050	0.0300	<0.0050	0.0050
NO3	3.49	3.96	2.71	2.71	3.61	3.83	4.74	4.94
PB	<0.0020	<0.0020	<0.0050	<0.0050	<0.0050	<0.0050	<0.0020	<0.0020
PH	7.60	7.40	8.30	8.10	8.40	8.20	8.32	8.11
SE	0.0020	0.0040	<0.0010	<0.0010	0.0060	0.0110	0.0013	<0.0010
SIO2	1.10	11.7	2.35	--	4.40	4.95	5.05	22.4
SO4	57.2	57.3	85.0	78.0	224.	230.	102.	105.
SR	0.290	0.430	0.720	0.780	1.45	1.57	0.710	0.730
TDS105	266	283	600	630	694.	656.	703.	735.
TI	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
TOC	9.00	11.0	23.0	28.0	7.00	7.00	7.50	8.30
TSS105	--	11.0	--	--	--	626.	--	--
U	<0.0500	<0.0200	0.0200	<0.0200	<0.0600	<0.0600	<0.200	<0.200
V	<1.00	<1.00	<0.0100	<0.0200	<0.0100	0.0700	<0.0500	0.0700
ZN	<0.0200	0.0200	<0.0200	<0.0200	<0.0200	0.0200	<0.0200	0.0400

* Unfiltered sample dated one day after actual sampling.

Table B3 (Cont)

Chemical Characteristics of Canada Brick Quarry Surface Water

Location DSC

Date	870625	870626*
AG	<0.0005	<0.0005
AL	<1.00	<1.00
ALKCO3	<5.00	<5.00
ALKHCO3	175.	172.
ALKOH	<5.00	<5.00
AS	<0.0010	<0.0010
B	0.450	0.450
BA	<2.00	<2.00
BE	--	--
BR	0.500	<0.500
CA	91.0	92.0
CD	<0.0001	<0.0001
CL	239.	227.
CO	--	--
COND	142.	144.
CR	<0.100	<0.100
CR(VI)	--	<0.0050
CU	0.0040	0.0050
FE	<0.0500	0.400
HARD	347.	352.
HG	<0.0002	<0.0002
I	<0.0500	0.0500
K	17.0	17.0
MG	30.0	30.0
MN	<0.0500	<0.500
MO	<0.500	<0.500
NA	150.	147.
NI	<0.0050	<0.0050
NO3	7.20	7.20
PB	<0.0050	<0.0050
PH	8.30	8.40
SE	<0.0010	0.0017
SIO2	6.20	5.10
SO4	158.	149.
SR	1.60	1.69
TDS105	920.	910.
TI	<1.00	<1.00
TOC	6.60	6.90
TSS105	--	--
U	<0.0200	<0.0200
V	<0.0100	<0.0100
ZN	<0.0200	<0.200

* Unfiltered sample dated one day after actual sampling.

Table B4

Chemical Characteristics of Canada Brick Quarry Surface Water

Location PSB

Date	800507	811130	820314	820324	820813	820827	820924	830921	830922*
AG	--	<0.0002	--	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
AL	--	<0.200	--	<0.200	<0.600	<0.200	<0.500	<0.500	<0.500
ALKCO3	--	--	--	<5.00	19.0	<5.00	9.00	22.0	27.0
ALKHCO3	--	110	--	86.0	160	65.0	133	127	122
ALKOH	--	--	--	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00
AS	--	0.0010	--	<0.0010	<0.0010	<0.0020	<0.0020	0.0010	0.0010
B	--	<0.500	--	<1.00	<0.500	<0.500	<1.00	1.66	1.71
BA	--	<1.00	--	<2.00	<8.00	1.00	1.40	<2.00	<2.00
BE	--	--	--	--	<0.0002	<0.0002	<0.0002	--	--
BR	--	0.100	--	<0.200	1.60	0.300	0.600	11.0	10.0
CA	--	58.0	--	34.0	97.0	43.0	70.0	220	223
CD	--	0.0010	--	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
CL	--	46.0	--	50.0	242	38.0	165	1100	1060
CO	--	--	--	--	--	--	<0.0500	--	--
COND	--	48.0	--	39.0	141	41.0	79.0	420	420
CR	--	<0.100	--	<0.0500	<0.0500	0.0040	<0.0500	<0.100	<0.100
CR(VI)	--	0.0050	--	0.0070	0.0040	--	--	<0.0100	<0.0100
CU	--	0.0030	--	0.0050	0.0130	0.0120	0.0070	0.0050	0.0040
FE	--	<0.0500	--	0.0500	<0.0500	<0.0500	<0.100	<0.0500	0.230
HARD	--	211	--	120	333	143	250	759	770
HG	--	--	--	<0.0002	<0.0002	0.0002	<0.0002	<0.0002	<0.0002
I	--	<0.0100	--	<0.0200	<0.200	<0.0500	<0.0500	<0.0200	<0.0200
K	--	5.80	--	4.70	11.0	4.20	6.20	29.0	29.0
MG	--	16.0	--	8.10	22.0	8.70	18.0	51.0	52.0
MN	--	<0.0200	--	<0.100	<0.0200	<0.0200	<0.0200	<0.0500	<0.0500
MO	--	<0.500	--	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500
NA	--	26.0	--	30.0	173	2.70	55.0	570	570
NI	--	<0.0050	--	<0.0050	<0.0050	<0.0050	0.0100	<0.0050	<0.0050
NO3	--	0.500	--	0.100	3.00	20.0	8.00	7.90	7.68
PB	--	0.0090	--	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
PH	--	8.10	--	7.90	8.30	7.90	8.00	8.30	8.20
SE	--	<0.0010	--	<0.0010	0.0040	<0.0020	<0.0020	0.0020	0.0020
SIO2	--	15.0	--	2.60	3.70	4.10	6.20	5.62	5.09
SO4	--	74.0	--	24.0	175	59.0	140	310	290
SR	--	0.130	--	0.140	1.12	0.200	0.400	2.50	2.50
TDS105	--	370	--	236	848	242	490	2700	2730
TI	--	<0.500	--	<1.00	<2.00	<1.00	<1.00	<1.00	<1.00
TOC	--	--	--	14.0	17.0	10.0	16.0	5.00	2.00
TSS105	--	48.0	--	--	--	--	34.0	7.00	7.00
U	--	<0.0100	--	<0.0100	<0.0600	<0.0200	<0.0010	<0.0500	<0.0500
V	--	<0.0050	--	<0.0100	<0.0200	<0.0030	<0.500	<0.0200	<0.0200
ZN	--	<0.0200	--	<0.0200	<0.0200	<0.0200	<0.0200	<0.0200	<0.0200

* Unfiltered sample dated one day after actual sampling.

Table B4 (Cont)

Chemical Characteristics of Canada Brick Quarry Surface Water

Location PSB

Date	831017	831018*	840217	840218*	840930	841001*	850702	850703*
AG	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
AL	<0.500	13.0	<0.500	12.0	<0.500	1.80	<1.00	<1.00
ALKCO3	<5.00	<5.00	<5.00	<5.00	12.0	<5.00	<5.00	<5.00
ALKHCO3	72.0	87.0	40.0	55.0	129	140	160	161
ALKOH	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00
AS	0.0030	<0.0010	<0.0010	0.0030	<0.0010	<0.0010	<0.0010	<0.0010
B	0.200	0.150	0.0700	0.0600	0.330	0.350	2.45	2.44
BA	<1.00	<1.00	<1.00	<1.00	<2.00	<2.00	<6.00	<5.00
BE	--	--	--	--	--	--	--	--
BR	0.210	<0.0500	<0.100	<0.100	0.900	0.600	10.0	9.00
CA	30.0	38.0	22.6	41.0	63.5	66.5	239	236
CD	<0.0001	0.0002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0003	<0.0003
CL	36.0	35.0	65.4	66.7	140	138	1070	1080
CO	--	--	--	--	--	--	--	--
COND	35.0	35.2	36.0	38.0	86.0	86.0	440	440
CR	<0.100	<0.100	<0.0500	<0.0500	<0.100	<0.100	<0.100	<0.100
CR(VI)	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0050	<0.0050
CU	0.0030	0.0140	0.0030	0.0230	0.0040	0.0060	0.0100	0.0060
FE	0.380	20.0	0.0600	21.6	<0.100	1.08	<0.0500	0.395
HARD	93.0	184	75.0	194	223	235	805	804
HG	<0.0002	<0.0002	<0.0002	<0.0002	0.0008	0.0006	0.0003	<0.0002
I	<0.0050	<0.0050	<0.0500	<0.0500	<0.0600	<0.0600	<0.200	<0.100
K	5.90	7.90	3.50	8.70	9.21	10.3	34.1	31.8
MG	6.70	13.0	4.60	13.0	15.8	16.7	50.9	52.3
MN	<0.0500	0.400	0.0800	0.650	<0.0050	<0.0500	<0.0500	<0.0500
MO	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	1.00	1.00
NA	27.0	28.0	40.0	38.0	87.4	86.6	605	615
NI	<0.0050	0.0120	<0.0050	0.0100	<0.0050	<0.0050	<0.0100	<0.0100
NO3	1.78	2.00	3.94	5.01	0.180	0.130	--	70.0
PB	0.0020	0.0170	<0.0020	0.0230	<0.0020	<0.0020	<0.0050	<0.0050
PH	8.00	7.80	7.50	7.60	8.00	7.80	8.30	8.20
SE	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0020	0.0020
SIO2	3.66	3.66	3.39	126	5.30	8.30	1.55	3.86
SO4	38.0	37.0	18.6	19.5	74.0	81.0	599	608
SR	0.220	0.270	0.120	0.200	1.07	1.00	5.00	5.00
TDS105	220	230	228	250	520	516	2830	2790
TI	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
TOC	13.0	12.0	11.5	10.6	25.0	27.0	21.0	26.0
TSS105	--	75.0	--	920	--	--	--	1.60
U	<0.0500	<0.0500	<0.0100	<0.0100	<0.0500	<0.0500	<0.100	<0.100
V	<0.0050	0.0110	<0.0050	0.0800	<0.0100	<0.0100	<0.100	<0.0500
ZN	<0.0200	0.0700	<0.0200	0.100	<0.0200	<0.0200	<0.0200	<0.0200

* Unfiltered sample dated one day after actual sampling.

Table B4 (Cont)

Chemical Characteristics of Canada Brick Quarry Surface Water

Location PSB

Date	851105	851106*	860618	860619*	861008	861009*	870403	870404*
AG	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0005	<0.0002	<0.0002
AL	<1.00	2.70	<1.00	3.90	<1.00	2.60	<1.00	3.20
ALKCO3	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00
ALKHCO3	90.0	107	203	205	133.	132.	139.	141.
ALKOH	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00
AS	0.0010	0.0030	<0.0010	<0.0010	<0.0010	0.0020	0.0010	0.0021
B	0.220	0.250	0.270	0.320	0.950	0.980	0.190	0.240
BA	<0.500	<0.500	<0.500	<0.500	<8.00	<8.00	<15.0	<15.0
BE	--	--	--	--	--	--	--	--
BR	0.100	0.200	0.500	0.800	1.60	1.30	<5.00	<10.0
CA	50.3	52.6	80.0	82.0	80.0	80.0	69.0	75.0
CD	<0.0001	<0.0001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0001	0.0002
CL	62.3	63.1	217	214	142.	150.	222.	240.
CO	--	--	--	--	--	--	--	--
COND	54.5	55.0	124	125	105.	108.	114.	118.
CR	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100
CR(VI)	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0050	<0.0050
CU	0.0050	0.0060	0.0120	0.0140	0.0070	0.0230	0.0040	0.0100
FE	0.100	2.56	<0.0500	3.00	<0.0500	4.50	<0.100	6.50
HARD	170	6.73	293	305	272.	278.	254.	277.
HG	<0.0002	0.0006	<0.0002	<0.0002	<0.0002	0.0002	<0.0002	0.0003
I	<0.0500	<0.0500	<0.100	<0.300	<0.200	<0.200	<0.500	<0.500
K	6.31	181	7.30	8.70	14.0	14.0	5.90	6.30
MG	10.9	12.2	22.7	24.2	17.5	19.0	20.0	22.0
MN	<0.0500	0.0500	<0.0500	0.0700	<0.0500	0.0900	<0.0500	0.140
MO	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500
NA	45.1	44.2	134	135	100.	104.	126.	130.
NI	0.0050	<0.0050	<0.0050	0.0050	<0.0050	0.0110	<0.0050	0.0050
NO3	4.38	4.24	5.81	6.14	4.56	4.44	6.20	6.40
PB	<0.0020	<0.0020	<0.0050	<0.0050	<0.0050	<0.0050	<0.0020	<0.0020
PH	7.50	7.60	8.20	8.10	8.30	8.10	8.34	8.11
SE	0.0030	0.0020	<0.0010	0.0020	0.0050	0.0040	0.0010	0.0010
SIO2	0.270	3.37	5.80	6.85	4.45	4.75	4.25	18.3
SO4	64.2	64.3	105	95.0	186.	193.	96.0	98.0
SR	0.170	0.190	0.950	0.940	1.29	1.61	0.760	0.750
TDS105	326	304	590	680	624.	656.	693.	743.
TI	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
TOC	11.0	12.0	26.0	28.0	8.00	6.00	8.20	8.10
TSS105	--	5.00	--	--	--	260.	--	--
U	<0.0500	0.0300	0.0200	0.0400	<0.0600	<0.0600	<0.200	<0.200
V	<1.00	<1.00	<0.0100	<0.0200	<0.0100	0.0200	<0.0500	<0.0500
ZN	<0.0200	0.0200	0.0400	0.190	<0.0200	0.140	<0.0200	0.0200

* Unfiltered sample dated one day after actual sampling.

Table B4 (Cont)

Chemical Characteristics of Canada Brick Quarry Surface Water

Location PSB

Date	870625	870626*
AG	<0.0005	<0.0005
AL	<1.00	<1.00
ALKCO3	<5.00	<5.00
ALKHCO3	212.	208.
ALKOH	<5.00	<5.00
AS	<0.0010	<0.0010
B	0.450	0.470
BA	<2.00	<2.00
BE	--	--
BR	0.600	0.500
CA	100.	98.0
CD	<0.0001	<0.0001
CL	228.	223.
CO	--	--
COND	145.	143.
CR	<0.100	<0.100
CR(VI)	--	<0.0050
CU	0.0040	0.0040
FE	<0.0500	0.270
HARD	373.	371.
HG	<0.0002	<0.0002
I	<0.0500	0.0600
K	17.0	17.0
MG	30.0	30.0
MN	<0.0500	<0.500
MO	<0.500	<0.500
NA	146.	143.
NI	<0.0050	<0.0050
NO3	9.10	9.10
PB	<0.0050	<0.0050
PH	8.30	8.30
SE	<0.0010	<0.0010
SIO2	6.50	6.15
SO4	142.	145.
SR	2.00	2.00
TDS105	918.	912.
TI	<1.00	<1.00
TOC	6.00	6.50
TSS105	--	--
U	<0.0200	<0.0200
V	<0.0100	<0.0100
ZN	<0.0200	<0.200

* Unfiltered sample dated one day after actual sampling.

APPENDIX C

CANADA BRICK QUARRY SURFACE WATER SURVEY
(MARY FIX CREEK)

MAJOR ION BALANCES AND PIPER PLOTS
1980-1987

Sampling Locations

CPO = CP Overpass
SPF = South Property Fence
DSC = Dundas Street Culvert
PSB = Paisley Street Bridge

EPM = equivalents per million

Table C1

Major Ion Chemistry
Canada Brick Quarry Surface Water
Location CPO

Cations

Date	Number	Calcium			Magnesium			Sodium			Potassium			Total Ions (EPM)		
		mg/L	EPM	%EPM	mg/L	EPM	%EPM	mg/L	EPM	%EPM	mg/L	EPM	%EPM	Cation	Anion	
800507	1	81.00	4.04	45.86	24.40	2.01	22.78	60.00	2.61	29.61	6.00	0.15	1.74	8.81	9.58	
811130	2	57.00	2.84	55.16	16.00	1.32	25.53	20.00	0.87	16.87	4.90	0.13	2.43	5.16	4.78	
820314	3	15.00	0.75	42.37	2.70	0.22	12.58	16.00	0.70	39.40	3.90	0.10	5.65	1.77	1.74	
820324	4	34.00	1.70	46.30	8.30	0.68	18.64	27.00	1.17	32.05	4.30	0.11	3.00	3.66	3.95	
820813	5	116.00	5.79	44.84	34.00	2.80	21.68	97.00	4.22	32.69	4.00	0.10	0.79	12.91	13.19	
820827	6	43.00	2.15	62.27	8.40	0.69	20.06	12.00	0.52	15.15	3.40	0.09	2.52	3.45	2.92	
820924	7	72.00	3.59	53.80	18.00	1.48	22.18	34.00	1.48	22.15	4.90	0.13	1.88	6.68	7.31	
830921	8	89.00	4.44	47.46	22.00	1.81	19.35	71.00	3.09	33.01	0.66	0.02	0.18	9.36	9.14	
830922	9	88.00	4.39	46.77	23.00	1.89	20.16	71.00	3.09	32.89	0.67	0.02	0.18	9.39	9.40	
831017	10	29.00	1.45	52.86	5.70	0.47	17.13	16.00	0.70	25.42	4.90	0.13	4.58	2.74	2.58	
831018	11	31.00	1.55	50.79	7.80	0.64	21.07	16.00	0.70	22.85	6.30	0.16	5.29	3.05	2.64	
840217	12	21.40	1.07	35.32	4.30	0.35	11.70	35.00	1.52	50.35	3.10	0.08	2.62	3.02	2.83	
840218	13	26.90	1.34	37.31	7.70	0.63	17.61	33.00	1.44	39.89	7.30	0.19	5.19	3.60	3.15	
840930	14	34.70	1.73	39.67	12.20	1.00	23.00	34.60	1.51	34.48	4.87	0.12	2.85	4.37	5.75	*
841001	15	46.10	2.30	41.46	12.50	1.03	18.54	47.80	2.08	37.47	5.49	0.14	2.53	5.55	5.72	
850702	16	130.00	6.49	27.61	40.70	3.35	14.26	310.00	13.48	57.40	6.75	0.17	0.73	23.49	25.53	
850703	17	129.00	6.44	27.27	41.20	3.39	14.36	313.00	13.61	57.67	6.48	0.17	0.70	23.61	23.43	
851105	18	39.10	1.95	48.05	8.93	0.73	18.10	28.90	1.26	30.96	4.61	0.12	2.90	4.06	4.17	
851106	19	40.90	2.04	47.89	9.96	0.82	19.23	29.30	1.27	29.91	4.95	0.13	2.97	4.26	3.77	
860618	20	74.00	3.69	36.30	21.70	1.79	17.55	105.00	4.57	44.89	5.00	0.13	1.26	10.17	10.60	
860619	21	88.00	4.39	37.27	32.50	2.67	22.70	104.00	4.52	38.40	7.50	0.19	1.63	11.78	10.63	
861008	22	69.00	3.44	42.33	19.50	1.60	19.73	67.00	2.91	35.83	6.70	0.17	2.11	8.13	8.19	
861009	23	138.00	6.89	51.89	38.00	3.13	23.56	69.00	3.00	22.62	10.00	0.26	1.93	13.27	8.92	*
870403	24	69.00	3.44	33.13	20.00	1.65	15.84	119.00	5.18	49.80	5.00	0.13	1.23	10.39	11.01	
870404	25	72.00	3.59	33.40	21.00	1.73	16.06	122.00	5.31	49.33	5.10	0.13	1.21	10.76	11.59	
870625	26	100.00	4.99	34.75	35.00	2.88	20.05	141.00	6.13	42.71	14.00	0.36	2.49	14.36	13.67	
870626	27	100.00	4.99	34.65	36.00	2.96	20.57	140.00	6.09	42.29	14.00	0.36	2.49	14.40	13.39	

* Indicates that cations and anions do not lie within 10% of mean

Table C1 (cont)

Major Ion Chemistry
Canada Brick Quarry Surface Water
Location CPO

Anions

Date	Number	Chloride			Sulphate			Bicarbonate as CaCO3			Carbonate as CaCO3			Total Ions (EPM)	
		mg/L	EPM	%EPM	mg/L	EPM	%EPM	mg/L	EPM	%EPM	mg/L	EPM	%EPM	Anion	Cation
800507	1	136.00	3.84	40.04	81.00	1.69	17.60	201.00	4.02	41.94	2.00	0.04	0.42	9.58	8.81
811130	2	40.00	1.13	23.58	70.00	1.46	30.46	110.00	2.20	45.96	0.00	0.00	0.00	4.78	5.16
820314	3	26.00	0.73	42.04	14.00	0.29	16.71	36.00	0.72	41.25	<5.00	0.00	0.00	1.74	1.77
820324	4	60.00	1.69	42.81	26.00	0.54	13.69	86.00	1.72	43.49	<5.00	0.00	0.00	3.95	3.66
820813	5	177.00	4.99	37.86	140.00	2.91	22.11	240.00	4.80	36.39	24.00	0.48	3.64	13.19	12.91
820827	6	22.00	0.62	21.25	49.00	1.02	34.94	64.00	1.28	43.81	<5.00	0.00	0.00	2.92	3.45
820924	7	85.00	2.40	32.78	95.00	1.98	27.04	137.00	2.74	37.45	10.00	0.20	2.73	7.31	6.68
830921	8	120.00	3.38	37.03	95.00	1.98	21.64	163.00	3.26	35.65	26.00	0.52	5.69	9.14	9.36
830922	9	130.00	3.67	39.00	94.00	1.96	20.81	165.00	3.30	35.08	24.00	0.48	5.10	9.40	9.39
831017	10	24.00	0.68	26.23	30.00	0.62	24.20	64.00	1.28	49.57	<5.00	0.00	0.00	2.58	2.74
831018	11	24.00	0.68	25.64	29.00	0.60	22.87	68.00	1.36	51.49	<5.00	0.00	0.00	2.64	3.05
840217	12	61.50	1.73	61.20	17.30	0.36	12.71	37.00	0.74	26.10	<5.00	0.00	0.00	2.83	3.02
840218	13	66.10	1.86	59.28	18.30	0.38	12.11	45.00	0.90	28.60	<5.00	0.00	0.00	3.15	3.60
840930	14	99.00	2.79	48.58	44.00	0.92	15.94	95.00	1.90	33.04	7.00	0.14	2.43	5.75	4.37 *
841001	15	98.00	2.76	48.34	43.00	0.90	15.66	103.00	2.06	36.01	<5.00	0.00	0.00	5.72	5.55
850702	16	639.00	18.02	70.61	151.00	3.14	12.32	218.00	4.36	17.07	<5.00	0.00	0.00	25.53	23.49
850703	17	572.00	16.13	68.87	140.00	2.91	12.44	219.00	4.38	18.69	<5.00	0.00	0.00	23.43	23.61
851105	18	43.60	1.23	29.49	38.50	0.80	19.22	107.00	2.14	51.29	<5.00	0.00	0.00	4.17	4.06
851106	19	42.20	1.19	31.54	37.70	0.78	20.80	90.00	1.80	47.67	<5.00	0.00	0.00	3.77	4.26
860618	20	193.00	5.44	51.37	67.00	1.39	13.16	188.00	3.76	35.47	<5.00	0.00	0.00	10.60	10.17
860619	21	192.00	5.42	50.94	70.00	1.46	13.71	188.00	3.76	35.35	<5.00	0.00	0.00	10.63	11.78
861008	22	118.00	3.33	40.63	78.00	1.62	19.83	162.00	3.24	39.54	<5.00	0.00	0.00	8.19	8.13
861009	23	120.00	3.38	37.97	112.00	2.33	26.16	160.00	3.20	35.88	<5.00	0.00	0.00	8.92	13.27 *
870403	24	220.00	6.21	56.38	99.00	2.06	18.73	137.00	2.74	24.89	<5.00	0.00	0.00	11.01	10.39
870404	25	240.00	6.77	58.41	99.00	2.06	17.78	138.00	2.76	23.80	<5.00	0.00	0.00	11.59	10.76
870625	26	233.00	6.57	48.07	149.00	3.10	22.69	200.00	4.00	29.24	<5.00	0.00	0.00	13.67	14.36
870626	27	231.00	6.52	48.66	141.00	2.94	21.92	197.00	3.94	29.41	<5.00	0.00	0.00	13.39	14.40

* Indicates that cations and anions do not lie within 10% of mean

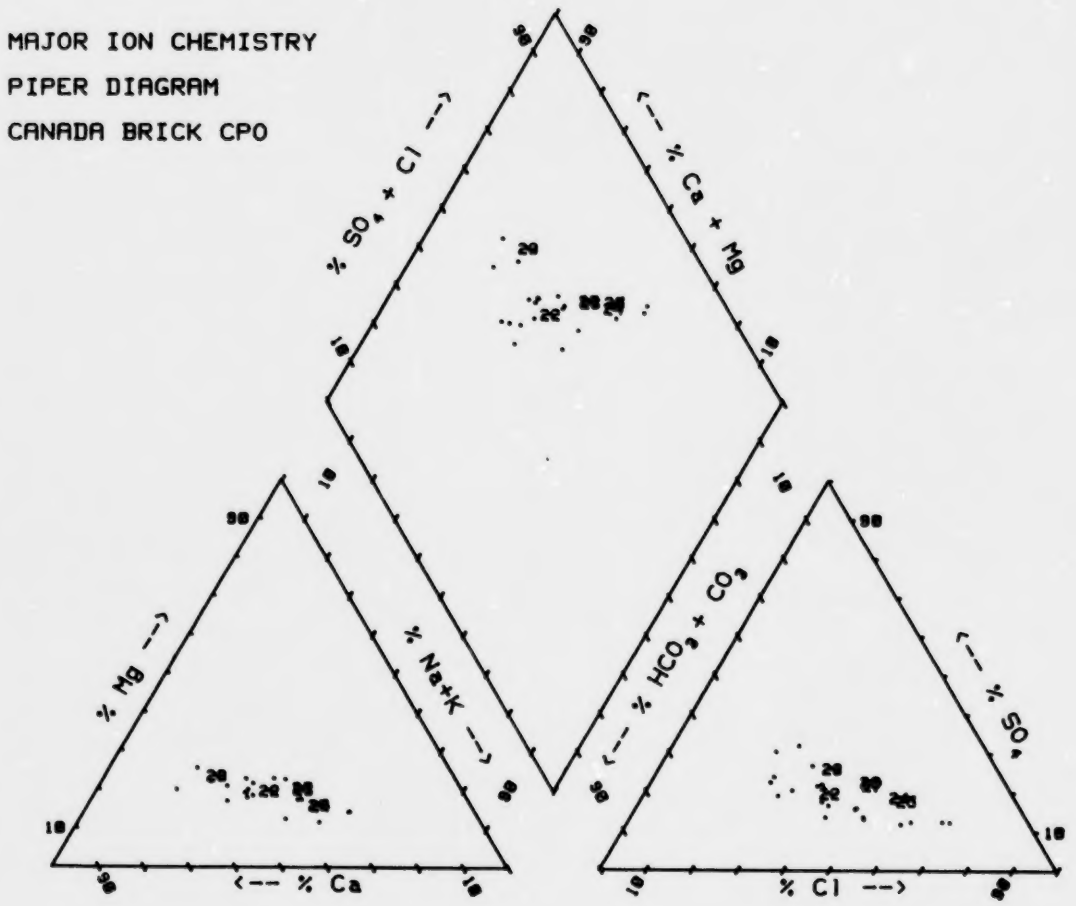
MAJOR ION CHEMISTRY
PIPER DIAGRAM
CANADA BRICK CPO
% SO4 + Cl -->
<-- % Ca + Mg
% Mg -->
% Na+K -->
<-- % HCO3 + CO3
<-- % SO4
<-- % Ca
% Cl -->

Figure 2

Table C2

Major Ion Chemistry
Canada Brick Quarry Surface Water
Location SPF

Cations

Date	Number	Calcium			Magnesium			Sodium			Potassium			Total Ions (EPM)	
		mg/L	EPM	%EPM	mg/L	EPM	%EPM	mg/L	EPM	%EPM	mg/L	EPM	%EPM	Cation	Anion
800507	1	79.00	3.94	45.84	22.80	1.88	21.82	61.00	2.65	30.85	5.00	0.13	1.49	8.60	8.98
811130	2	57.00	2.84	52.38	16.00	1.32	24.25	26.00	1.13	20.83	5.40	0.14	2.54	5.43	4.88
820314	3	17.00	0.85	41.41	3.30	0.27	13.26	19.00	0.83	40.34	4.00	0.10	4.99	2.05	2.05
820324	4	33.00	1.65	45.13	8.10	0.67	18.27	28.00	1.22	33.38	4.60	0.12	3.22	3.65	3.69
820813	5	259.00	12.92	22.44	54.00	4.44	7.72	900.00	39.15	67.98	42.00	1.07	1.87	57.59	59.58
820827	6	45.00	2.25	70.52	8.60	0.71	22.22	2.90	0.13	3.96	4.10	0.10	3.29	3.18	3.73
820924	7	72.00	3.59	36.32	18.00	1.48	14.97	105.00	4.57	46.17	9.80	0.25	2.53	9.89	11.74
830921	8	207.00	10.33	24.35	46.00	3.79	8.92	630.00	27.40	64.61	35.00	0.90	2.11	42.41	43.34
830922	9	208.00	10.38	24.15	47.00	3.87	9.00	640.00	27.84	64.77	35.00	0.90	2.08	42.98	41.38
831017	10	29.00	1.45	44.09	6.10	0.50	15.29	27.00	1.17	35.78	6.20	0.16	4.83	3.28	3.12
831018	11	40.00	2.00	39.51	20.00	1.65	32.58	27.00	1.17	23.25	9.20	0.24	4.66	5.05	3.62 *
840217	12	22.00	1.10	32.05	4.50	0.37	10.81	43.00	1.87	54.60	3.40	0.09	2.54	3.43	3.01
840218	13	35.00	1.75	39.80	10.50	0.86	19.69	36.00	1.57	35.68	8.30	0.21	4.84	4.39	3.29 *
840930	14	35.70	1.78	38.32	7.50	0.62	13.27	49.40	2.15	46.22	3.98	0.10	2.19	4.65	6.63 *
841001	15	49.90	2.49	38.31	9.60	0.79	12.16	70.80	3.08	47.39	5.45	0.14	2.14	6.50	6.34
850702	16	261.00	13.02	26.06	55.90	4.60	9.20	720.00	31.32	62.67	40.40	1.03	2.07	49.98	58.78
850703	17	264.00	13.17	26.03	58.60	4.82	9.53	725.00	31.54	62.30	42.50	1.09	2.15	50.62	54.66
851105	18	41.40	2.07	43.50	9.19	0.76	15.92	40.80	1.77	37.37	5.95	0.15	3.20	4.75	4.42
851106	19	42.50	2.12	44.32	10.20	0.84	17.54	38.30	1.67	34.82	6.21	0.16	3.32	4.78	4.41
860618	20	72.70	3.63	32.46	21.20	1.74	15.61	130.00	5.65	50.59	5.87	0.15	1.34	11.18	11.57
860619	21	75.00	3.74	32.53	23.20	1.91	16.59	130.00	5.65	49.15	7.80	0.20	1.73	11.51	11.53
861008	22	86.00	4.29	38.53	18.50	1.52	13.67	113.00	4.92	44.13	16.00	0.41	3.67	11.14	11.96
861009	23	86.00	4.29	37.60	21.00	1.73	15.14	114.00	4.96	43.45	17.00	0.43	3.81	11.41	11.99
870403	24	68.00	3.39	31.55	20.00	1.65	15.30	128.00	5.57	51.77	5.80	0.15	1.38	10.76	11.08
870404	25	71.00	3.54	31.86	22.00	1.81	16.28	129.00	5.61	50.46	6.10	0.16	1.40	11.12	11.81
870625	26	90.00	4.49	31.94	31.00	2.55	18.14	152.00	6.61	47.02	16.00	0.41	2.91	14.06	13.60
870626	27	91.00	4.54	32.58	31.00	2.55	18.30	148.00	6.44	46.19	16.00	0.41	2.94	13.94	13.02

* Indicates that cations and anions do not lie within 10% of mean

Table C2 (cont)

Major Ion Chemistry
Canada Brick Quarry Surface Water
Location SPF

Anions

Date	Number	Chloride			Sulphate			Bicarbonate as CaCO3			Carbonate as CaCO3			Total Ions (EPM)		
		mg/L	EPM	%EPM	mg/L	EPM	%EPM	mg/L	EPM	%EPM	mg/L	EPM	%EPM	Anion	Cation	
800507	1	122.00	3.44	38.34	78.00	1.62	18.09	190.00	3.80	42.32	5.60	0.11	1.25	8.98	8.60	
811130	2	42.00	1.18	24.26	72.00	1.50	30.70	110.00	2.20	45.04	0.00	0.00	0.00	4.88	5.43	
820314	3	34.00	0.96	46.78	14.00	0.29	14.22	40.00	0.80	39.01	<5.00	0.00	0.00	2.05	2.05	
820324	4	55.00	1.55	42.05	23.00	0.48	12.98	83.00	1.66	44.97	<5.00	0.00	0.00	3.69	3.65	
820813	5	1700.00	47.95	80.48	450.00	9.37	15.73	99.00	1.98	3.32	14.00	0.28	0.47	59.58	57.59	
820827	6	41.00	1.16	31.02	63.00	1.31	35.19	63.00	1.26	33.79	<5.00	0.00	0.00	3.73	3.18	
820924	7	215.00	6.06	51.65	145.00	3.02	25.71	120.00	2.40	20.43	13.00	0.26	2.21	11.74	9.89	
830921	8	1200.00	33.85	78.10	330.00	6.87	15.85	117.00	2.34	5.40	14.00	0.28	0.65	43.34	42.41	
830922	9	1130.00	31.87	77.02	330.00	6.87	16.60	107.00	2.14	5.17	25.00	0.50	1.21	41.38	42.98	
831017	10	35.00	0.99	31.66	38.00	0.79	25.38	67.00	1.34	42.96	<5.00	0.00	0.00	3.12	3.28	
831018	11	35.00	0.99	27.30	36.00	0.75	20.73	94.00	1.88	51.97	<5.00	0.00	0.00	3.62	5.05	*
840217	12	65.40	1.84	61.29	18.50	0.39	12.80	39.00	0.78	25.91	<5.00	0.00	0.00	3.01	3.43	
840218	13	66.60	1.88	57.16	19.60	0.41	12.42	50.00	1.00	30.42	<5.00	0.00	0.00	3.29	4.39	*
840930	14	125.00	3.53	53.21	50.00	1.04	15.71	94.00	1.88	28.36	9.00	0.18	2.72	6.63	4.65	*
841001	15	118.00	3.33	52.52	45.60	0.95	14.98	103.00	2.06	32.49	<5.00	0.00	0.00	6.34	6.50	
850702	16	1420.00	40.05	68.14	768.00	15.99	27.20	137.00	2.74	4.66	<5.00	0.00	0.00	58.78	49.98	
850703	17	1310.00	36.95	67.60	718.00	14.95	27.35	138.00	2.76	5.05	<5.00	0.00	0.00	54.66	50.62	
851105	18	51.10	1.44	32.64	58.40	1.22	27.53	88.00	1.76	39.83	<5.00	0.00	0.00	4.42	4.75	
851106	19	51.50	1.45	32.96	55.50	1.16	26.22	90.00	1.80	40.82	<5.00	0.00	0.00	4.41	4.78	
860618	20	215.00	6.06	52.40	85.00	1.77	15.29	187.00	3.74	32.30	<5.00	0.00	0.00	11.57	11.18	
860619	21	210.00	5.92	51.36	88.00	1.83	15.89	189.00	3.78	32.76	<5.00	0.00	0.00	11.53	11.51	
861008	22	162.00	4.57	38.22	229.00	4.77	39.88	131.00	2.62	21.90	<5.00	0.00	0.00	11.96	11.14	
861009	23	164.00	4.63	38.57	228.00	4.75	39.59	131.00	2.62	21.84	<5.00	0.00	0.00	11.99	11.41	
870403	24	222.00	6.26	56.49	102.00	2.12	19.16	135.00	2.70	24.35	<5.00	0.00	0.00	11.08	10.76	
870404	25	244.00	6.88	58.29	104.00	2.17	18.34	138.00	2.76	23.37	<5.00	0.00	0.00	11.81	11.12	
870625	26	245.00	6.91	50.83	154.00	3.21	23.58	174.00	3.48	25.59	<5.00	0.00	0.00	13.60	14.06	
870626	27	232.00	6.54	50.25	147.00	3.06	23.50	171.00	3.42	26.25	<5.00	0.00	0.00	13.02	13.94	

* Indicates that cations and anions do not lie within 10% of mean

MAJOR ION CHEMISTRY

PIPER DIAGRAM

CANADA BRICK SPF

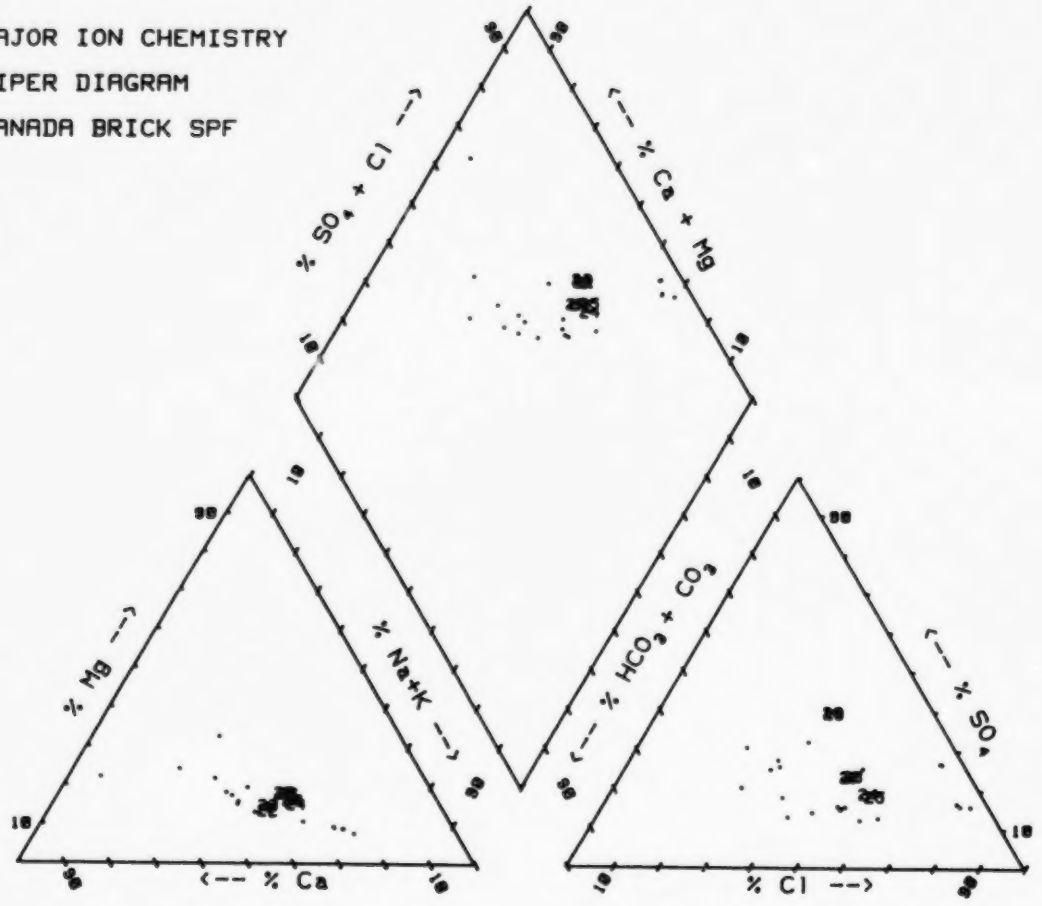

Figure 3

Table C3

Major Ion Chemistry
Canada Brick Quarry Surface Water
Location DSC

Cations

Date	Number	Calcium			Magnesium			Sodium			Potassium			Total Ions (EPM)		
		mg/L	EPM	%EPM	mg/L	EPM	%EPM	mg/L	EPM	%EPM	mg/L	EPM	%EPM	Cation	Anion	
820314	1	15.00	0.75	44.57	2.70	0.22	13.23	14.00	0.61	36.26	3.90	0.10	5.94	1.68	1.74	
820813	2	262.00	13.07	23.82	55.00	4.53	8.24	835.00	36.32	66.17	38.00	0.97	1.77	54.89	55.97	
820827	3	44.00	2.20	69.82	8.80	0.72	23.03	2.70	0.12	3.73	4.20	0.11	3.42	3.14	3.66	
820924	4	70.00	3.49	36.85	18.00	1.48	15.62	98.00	4.26	44.97	9.50	0.24	2.56	9.48	9.62	
830921	5	214.00	10.68	24.63	48.00	3.95	9.11	640.00	27.84	64.20	35.00	0.90	2.06	43.36	43.44	
830922	6	208.00	10.38	24.10	48.00	3.95	9.17	640.00	27.84	64.65	35.00	0.90	2.08	43.06	38.45	
831017	7	33.00	1.65	45.64	7.20	0.59	16.42	28.00	1.22	33.76	5.90	0.15	4.18	3.61	3.46	
831018	8	38.00	1.90	43.18	13.00	1.07	24.36	28.00	1.22	27.74	8.10	0.21	4.72	4.39	3.77	
840217	9	22.10	1.10	33.78	4.60	0.38	11.59	39.00	1.70	51.96	3.40	0.09	2.66	3.26	3.05	
840218	10	35.00	1.75	38.66	11.10	0.91	20.22	37.00	1.61	35.63	9.70	0.25	5.49	4.52	3.37	*
840930	11	51.10	2.55	35.31	12.90	1.06	14.70	78.90	3.43	47.52	6.96	0.18	2.47	7.22	7.15	
841001	12	41.50	2.07	33.95	13.70	1.13	18.48	61.90	2.69	44.14	8.18	0.21	3.43	6.10	7.02	
850702	13	267.00	13.32	26.69	54.90	4.52	9.05	712.00	30.97	62.04	43.20	1.10	2.21	49.92	56.94	
850703	14	263.00	13.12	26.19	57.00	4.69	9.36	719.00	31.27	62.42	39.80	1.02	2.03	50.11	62.54	*
851105	15	42.90	2.14	43.43	9.46	0.78	15.79	42.70	1.86	37.68	5.98	0.15	3.10	4.93	4.56	
851106	16	43.90	2.19	44.33	10.50	0.86	17.49	39.70	1.73	34.95	6.25	0.16	3.24	4.94	4.63	
860618	17	73.50	3.67	32.81	21.20	1.74	15.60	129.00	5.61	50.19	6.10	0.16	1.40	11.18	11.61	
860619	18	75.00	3.74	32.49	22.50	1.85	16.07	132.00	5.74	49.84	7.20	0.18	1.60	11.52	11.39	
861008	19	84.00	4.19	37.82	18.50	1.52	13.74	114.00	4.96	44.75	16.00	0.41	3.69	11.08	11.83	
861009	20	90.00	4.49	38.54	21.50	1.77	15.18	114.00	4.96	42.55	17.00	0.43	3.73	11.65	11.90	
870403	21	67.00	3.34	31.75	20.00	1.65	15.63	124.00	5.39	51.23	5.70	0.15	1.38	10.53	11.08	
870404	22	77.00	3.84	34.17	23.00	1.89	16.83	123.00	5.35	47.57	6.30	0.16	1.43	11.25	11.60	
870625	23	91.00	4.54	32.51	30.00	2.47	17.67	150.00	6.52	46.71	17.00	0.43	3.11	13.97	13.53	
870626	24	92.00	4.59	33.06	30.00	2.47	17.77	147.00	6.39	46.04	17.00	0.43	3.13	13.89	12.94	

* Indicates that cations and anions do not lie within 10% of mean

Table C3 (cont)

Major Ion Chemistry
Canada Brick Quarry Surface Water
Location DSC

Anions

Date	Number	Chloride			Sulphate			Bicarbonate as CaCO3			Carbonate as CaCO3			Total Ions (EPM)		
		mg/L	EPM	%EPM	mg/L	EPM	%EPM	mg/L	EPM	%EPM	mg/L	EPM	%EPM	Anion	Cation	
820314	1	26.00	0.73	42.04	14.00	0.29	16.71	36.00	0.72	41.25	<5.00	0.00	0.00	1.74	1.68	
820813	2	1575.00	44.43	79.37	450.00	9.37	16.74	92.00	1.84	3.29	17.00	0.34	0.61	55.97	54.89	
820827	3	38.00	1.07	29.27	61.00	1.27	34.69	66.00	1.32	36.04	<5.00	0.00	0.00	3.66	3.14	
820924	4	165.00	4.65	48.36	110.00	2.29	23.80	121.00	2.42	25.14	13.00	0.26	2.70	9.62	9.48	
830921	5	1200.00	33.85	77.92	330.00	6.87	15.82	121.00	2.42	5.57	15.00	0.30	0.69	43.44	43.36	
830922	6	1030.00	29.05	75.55	320.00	6.66	17.33	110.00	2.20	5.72	27.00	0.54	1.40	38.45	43.06	
831017	7	40.00	1.13	32.60	40.00	0.83	24.07	75.00	1.50	43.33	<5.00	0.00	0.00	3.46	3.61	
831018	8	39.00	1.10	29.16	41.00	0.85	22.63	91.00	1.82	48.22	<5.00	0.00	0.00	3.77	4.39	
840217	9	64.90	1.83	60.04	20.10	0.42	13.73	40.00	0.80	26.23	<5.00	0.00	0.00	3.05	3.26	
840218	10	68.10	1.92	57.06	19.50	0.41	12.06	52.00	1.04	30.88	<5.00	0.00	0.00	3.37	4.52	*
840930	11	140.00	3.95	55.21	54.00	1.12	15.72	104.00	2.08	29.07	<5.00	0.00	0.00	7.15	7.22	
841001	12	133.00	3.75	53.42	53.40	1.11	15.83	108.00	2.16	30.75	<5.00	0.00	0.00	7.02	6.10	
850702	13	1340.00	37.80	66.38	788.00	16.41	28.81	137.00	2.74	4.81	<5.00	0.00	0.00	56.94	49.92	
850703	14	1470.00	41.46	66.29	880.00	18.32	29.29	138.00	2.76	4.41	<5.00	0.00	0.00	62.54	50.11	*
851105	15	54.80	1.55	33.93	57.20	1.19	26.14	91.00	1.82	39.93	<5.00	0.00	0.00	4.56	4.93	
851106	16	56.60	1.60	34.49	57.30	1.19	25.77	92.00	1.84	39.74	<5.00	0.00	0.00	4.63	4.94	
860618	17	217.00	6.12	52.72	85.00	1.77	15.24	186.00	3.72	32.03	<5.00	0.00	0.00	11.61	11.18	
860619	18	213.00	6.01	52.75	78.00	1.62	14.26	188.00	3.76	33.00	<5.00	0.00	0.00	11.39	11.52	
861008	19	162.00	4.57	38.62	224.00	4.66	39.42	130.00	2.60	21.97	<5.00	0.00	0.00	11.83	11.08	
861009	20	160.00	4.51	37.92	230.00	4.79	40.24	130.00	2.60	21.84	<5.00	0.00	0.00	11.90	11.65	
870403	21	222.00	6.26	56.49	102.00	2.12	19.16	135.00	2.70	24.35	<5.00	0.00	0.00	11.08	10.53	
870404	22	233.00	6.57	56.67	105.00	2.19	18.85	142.00	2.84	24.48	<5.00	0.00	0.00	11.60	11.25	
870625	23	239.00	6.74	49.83	158.00	3.29	24.31	175.00	3.50	25.86	<5.00	0.00	0.00	13.53	13.97	
870626	24	227.00	6.40	49.47	149.00	3.10	23.97	172.00	3.44	26.57	<5.00	0.00	0.00	12.94	13.89	

* Indicates that cations and anions do not lie within 10% of mean

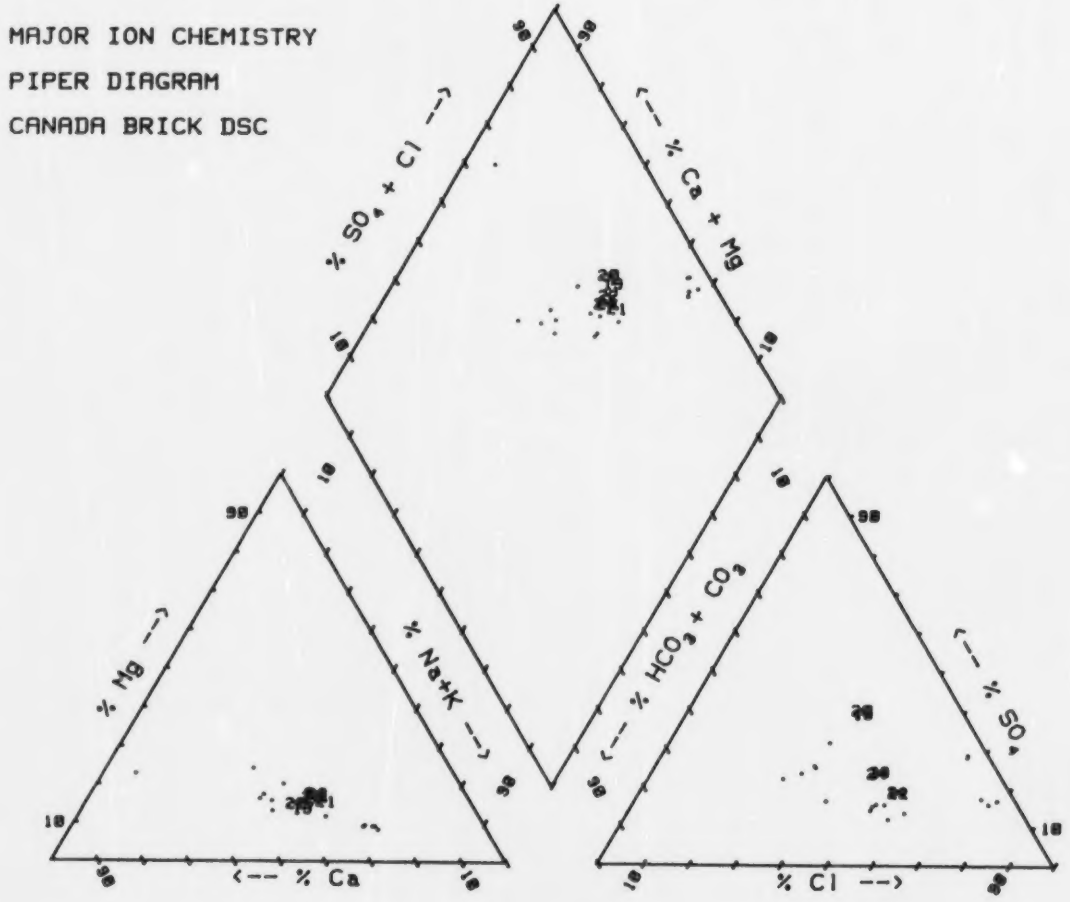
MAJOR ION CHEMISTRY
PIPER DIAGRAM
CANADA BRICK DSC
% SO4 + Cl -->
<-- % Ca + Mg
% Mg -->
% Na+K -->
<-- % HCO3 + CO3
<-- % SO4
<-- % Ca
% Cl -->

Figure 4

Table C4

Major Ion Chemistry
Canada Brick Quarry Surface Water
Location PSB

Cations

Date	Number	Calcium			Magnesium			Sodium			Potassium			Total Ions (EPM)		
		mg/L	EPM	%EPM	mg/L	EPM	%EPM	mg/L	EPM	%EPM	mg/L	EPM	%EPM	Cation	Anion	
811130	1	58.00	2.89	52.72	16.00	1.32	23.98	26.00	1.13	20.60	5.80	0.15	2.70	5.49	5.04	
820324	2	34.00	1.70	44.79	8.10	0.67	17.59	30.00	1.30	34.45	4.70	0.12	3.17	3.79	3.63	
820813	3	97.00	4.84	33.48	22.00	1.81	12.52	173.00	7.53	52.05	11.00	0.28	1.95	14.46	14.05	
820827	4	43.00	2.15	69.52	8.70	0.72	23.19	2.70	0.12	3.81	4.20	0.11	3.48	3.09	3.60	
820924	5	70.00	3.49	46.42	18.00	1.48	19.68	55.00	2.39	31.79	6.20	0.16	2.11	7.53	10.41	*
830921	6	220.00	10.98	26.97	51.00	4.20	10.31	570.00	24.79	60.90	29.00	0.74	1.82	40.71	40.46	
830922	7	223.00	11.13	27.18	52.00	4.28	10.45	570.00	24.79	60.56	29.00	0.74	1.81	40.94	38.92	
831017	8	30.00	1.50	44.37	6.70	0.55	16.34	27.00	1.17	34.81	5.90	0.15	4.47	3.37	3.25	
831018	9	38.00	1.90	43.23	13.00	1.07	24.39	28.00	1.22	27.77	7.90	0.20	4.61	4.39	3.50	*
840217	10	22.60	1.13	33.81	4.60	0.38	11.35	40.00	1.74	52.16	3.50	0.09	2.68	3.34	3.03	
840218	11	41.00	2.05	40.99	13.00	1.07	21.43	38.00	1.65	33.12	8.70	0.22	4.46	4.99	3.39	*
840930	12	63.50	3.17	37.25	15.80	1.30	15.28	87.40	3.80	44.69	9.21	0.24	2.77	8.51	8.31	
841001	13	66.50	3.32	38.04	16.70	1.37	15.75	86.60	3.77	43.18	10.30	0.26	3.02	8.72	8.38	
850702	14	239.00	11.93	27.54	50.90	4.19	9.67	605.00	26.32	60.77	34.10	0.87	2.01	43.30	45.85	
850703	15	236.00	11.78	26.98	52.30	4.30	9.86	615.00	26.75	61.29	31.80	0.81	1.86	43.64	46.34	
851105	16	50.30	2.51	45.39	10.90	0.90	16.22	45.10	1.96	35.47	6.31	0.16	2.92	5.53	4.89	
851106	17	52.60	2.62	43.64	12.20	1.00	16.69	44.20	1.92	31.97	18.10	0.46	7.70	6.01	5.26	
860618	18	80.00	3.99	33.62	22.70	1.87	15.73	134.00	5.83	49.08	7.30	0.19	1.57	11.88	12.37	
860619	19	82.00	4.09	33.60	24.20	1.99	16.35	135.00	5.87	48.22	8.70	0.22	1.83	12.18	12.11	
861008	20	80.00	3.99	39.37	17.50	1.44	14.20	100.00	4.35	42.90	14.00	0.36	3.53	10.14	10.54	
861009	21	80.00	3.99	38.25	19.00	1.56	14.98	104.00	4.52	43.34	14.00	0.36	3.43	10.44	10.89	
870403	22	69.00	3.44	32.12	20.00	1.65	15.35	126.00	5.48	51.12	5.90	0.15	1.41	10.72	11.04	
870404	23	75.00	3.74	32.92	22.00	1.81	15.92	130.00	5.65	49.74	6.30	0.16	1.42	11.37	11.63	
870625	24	100.00	4.99	35.03	30.00	2.47	17.33	146.00	6.35	44.58	17.00	0.43	3.05	14.24	13.63	
870626	25	98.00	4.89	34.90	30.00	2.47	17.62	143.00	6.22	44.39	17.00	0.43	3.10	14.01	13.47	

* Indicates that cations and anions do not lie within 10% of mean

Table C4 (cont)

Major Ion Chemistry
Canada Brick Quarry Surface Water
Location PSB

Anions

Date	Number	Chloride			Sulphate			Bicarbonate as CaCO3			Carbonate as CaCO3			Total Ions (EPM)	
		mg/L	EPM	%EPM	mg/L	EPM	%EPM	mg/L	EPM	%EPM	mg/L	EPM	%EPM	Anion	Cation
811130	1	46.00	1.30	25.76	74.00	1.54	30.59	110.00	2.20	43.66	0.00	0.00	0.00	5.04	5.49
820324	2	50.00	1.41	38.86	24.00	0.50	13.77	86.00	1.72	47.37	<5.00	0.00	0.00	3.63	3.79
820813	3	242.00	6.83	48.59	175.00	3.64	25.94	160.00	3.20	22.77	19.00	0.38	2.70	14.05	14.46
820827	4	38.00	1.07	29.78	59.00	1.23	34.12	65.00	1.30	36.10	<5.00	0.00	0.00	3.60	3.09
820924	5	165.00	4.65	44.72	140.00	2.91	28.01	133.00	2.66	25.55	9.00	0.18	1.73	10.41	7.53 *
830921	6	1100.00	31.03	76.69	310.00	6.45	15.95	127.00	2.54	6.28	22.00	0.44	1.09	40.46	40.71
830922	7	1060.00	29.90	76.83	290.00	6.04	15.52	122.00	2.44	6.27	27.00	0.54	1.39	38.92	40.94
831017	8	36.00	1.02	31.28	38.00	0.79	24.37	72.00	1.44	44.34	<5.00	0.00	0.00	3.25	3.37
831018	9	35.00	0.99	28.23	37.00	0.77	22.03	87.00	1.74	49.74	<5.00	0.00	0.00	3.50	4.39 *
840217	10	65.40	1.84	60.85	18.60	0.39	12.77	40.00	0.80	26.38	<5.00	0.00	0.00	3.03	3.34
840218	11	66.70	1.88	55.55	19.50	0.41	11.99	55.00	1.10	32.46	<5.00	0.00	0.00	3.39	4.99 *
840930	12	140.00	3.95	47.53	74.00	1.54	18.54	129.00	2.58	31.04	12.00	0.24	2.89	8.31	8.51
841001	13	138.00	3.89	46.46	81.00	1.69	20.13	140.00	2.80	33.41	<5.00	0.00	0.00	8.38	8.72
850702	14	1070.00	30.18	65.82	599.00	12.47	27.20	160.00	3.20	6.98	<5.00	0.00	0.00	45.85	43.30
850703	15	1080.00	30.46	65.74	608.00	12.66	27.32	161.00	3.22	6.95	<5.00	0.00	0.00	46.34	43.64
851105	16	62.30	1.76	35.91	64.20	1.34	27.32	90.00	1.80	36.77	<5.00	0.00	0.00	4.89	5.53
851106	17	63.10	1.78	33.85	64.30	1.34	25.46	107.00	2.14	40.69	<5.00	0.00	0.00	5.26	6.01
860618	18	217.00	6.12	49.50	105.00	2.19	17.68	203.00	4.06	32.82	<5.00	0.00	0.00	12.37	11.88
860619	19	214.00	6.04	49.83	95.00	1.98	16.33	205.00	4.10	33.84	<5.00	0.00	0.00	12.11	12.18
861008	20	142.00	4.01	38.01	186.00	3.87	36.75	133.00	2.66	25.23	<5.00	0.00	0.00	10.54	10.14
861009	21	150.00	4.23	38.86	193.00	4.02	36.91	132.00	2.64	24.24	<5.00	0.00	0.00	10.89	10.44
870403	22	222.00	6.26	56.72	96.00	2.00	18.11	139.00	2.78	25.17	<5.00	0.00	0.00	11.04	10.72
870404	23	240.00	6.77	58.21	98.00	2.04	17.55	141.00	2.82	24.24	<5.00	0.00	0.00	11.63	11.37
870625	24	228.00	6.43	47.20	142.00	2.96	21.70	212.00	4.24	31.10	<5.00	0.00	0.00	13.63	14.24
870626	25	223.00	6.29	46.71	145.00	3.02	22.42	208.00	4.16	30.88	<5.00	0.00	0.00	13.47	14.01

* Indicates that cations and anions do not lie within 10% of mean

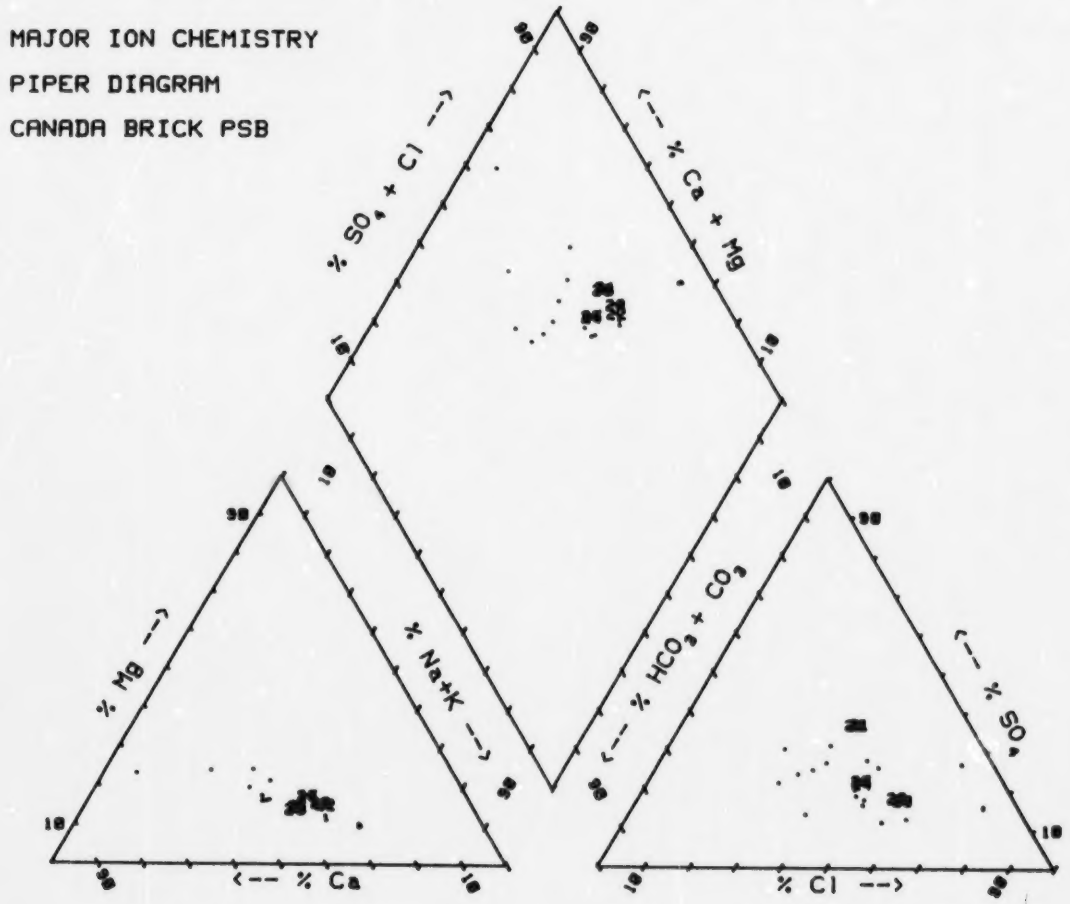
MAJOR ION CHEMISTRY
PIPER DIAGRAM
CANADA BRICK PSB
% SO4 + Cl -->
<-- % Ca + Mg
% Mg -->
% Na+K -->
<-- % HCO3 + CO3
<-- % SO4
<-- % Ca
% Cl -->

Figure 5

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